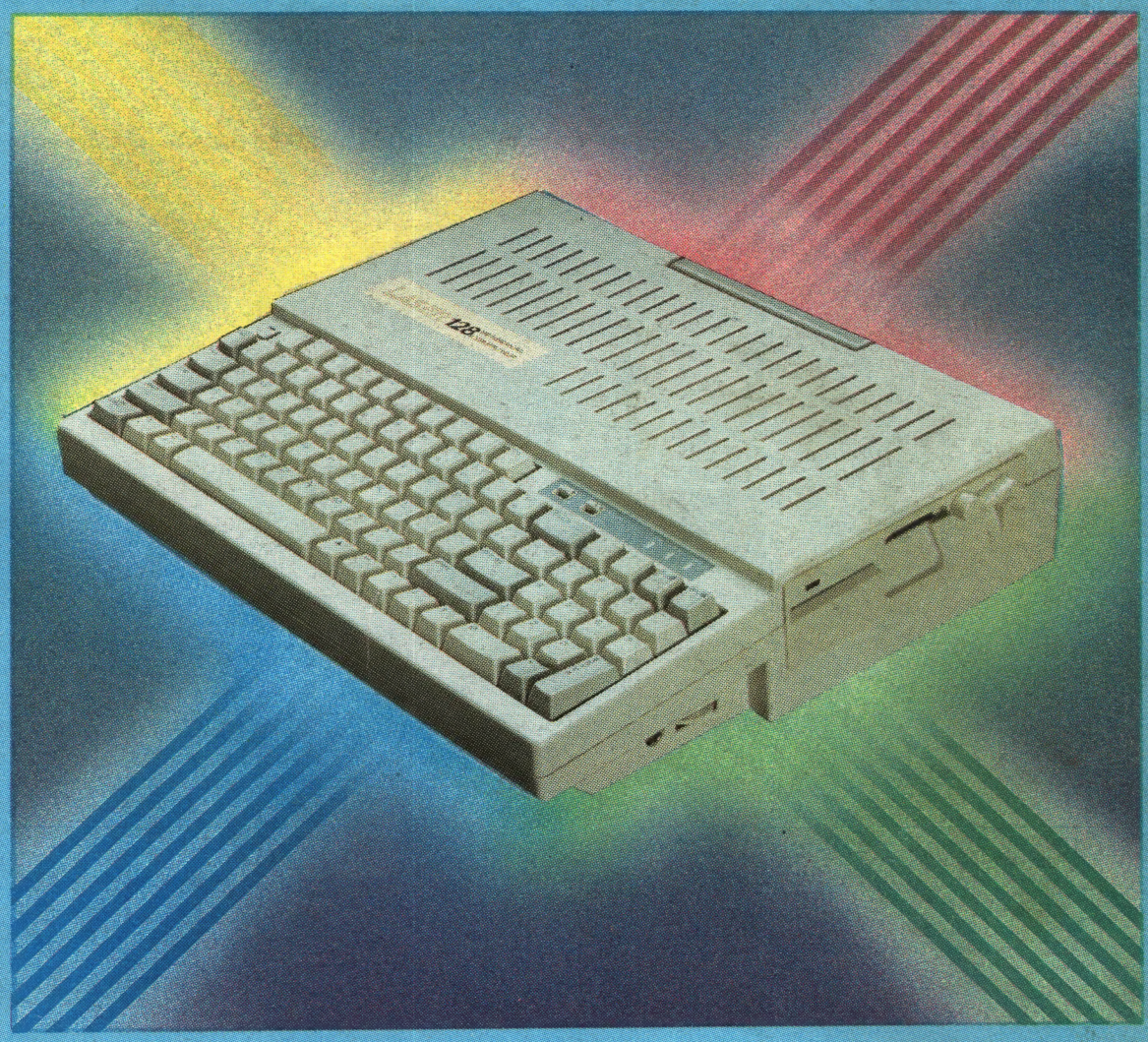
NATIONAL PUBLICATION FOR BUYING-USING-SELLING COMPUTER HARDWARE & SOFTWARE

COMPUTER SHOPPER™

JUNE 1986
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ISSUE 77
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℮ 02927
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MONEY SAVING ADS & ARTICLES

IIc or Not IIc
How Compatible is Laser 128?



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- ***Spotlight on Medical Computer Resources***
- ***Re-birth of "Home Computers"***
- ***IBM Introduces PC Convertible & Faster AT***
- ***New Hero 2000® Robot from Zenith***

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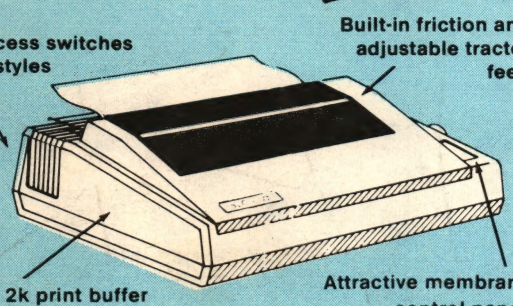
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star SG-10

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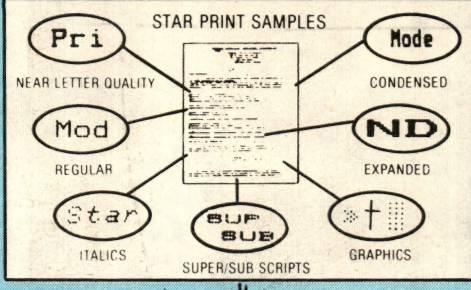


If you are looking for a top quality printer at an affordable price, you've found both in the new Star SG-10. The SG-10 operates bi-directionally at 120 cps and includes many special features such as near letter quality printing, easy access format switches for a wide range of character modes and character sets, friction feed for single sheets, and tractor feed for fanfold paper, and even hex dump. Another special feature is the IBM character sets available at the flip of a switch.

These features give the SG-10 versatility enough for home or office. There is also a 2K buffer standard and is expandable to 8k that lets you continue to work without waiting on your printer. Easy to interface with all popular computers such as IBM, Apple, Atari, Commodore, Sanyo, and Zenith. Breakdowns are virtually unheard of with the SG-10 manufactured by the company with thirty-five years of micro-precision experience for quality and reliability. Whatever your personal computer, Star's SG-10 provides reliable and flexible performance so your needs will be met today . . . and tomorrow.

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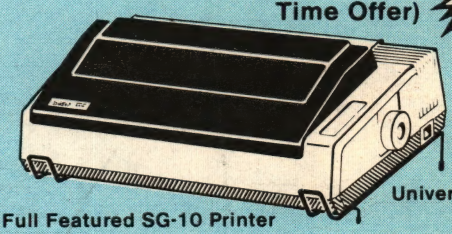


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From MidWest Micro

JUST $269 (Limited Time Offer)

Save $199



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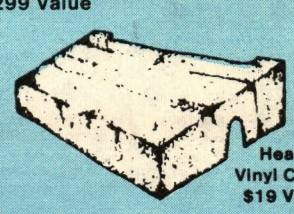
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Universal Printer Stand $49 Value

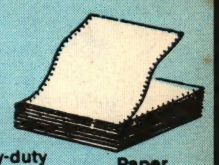
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Immediate Replacement Warranty - See Below!



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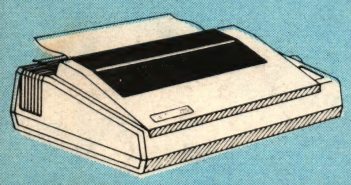
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2. A **Universal Printer Stand** which tilts printer toward you for easy access and creates space for organizing paper
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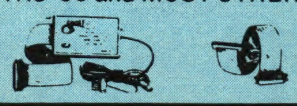
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SR-15 (200 Cps, 132 Col, NLQ Mode)	799	*CALL
POWERTYPE DAISYWHEEL	499	*CALL

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NEW

Get the affordable daisywheel printer alone in its class with. . .

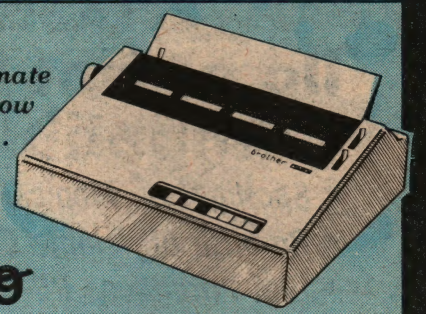
brother HR-15XL DAISYWHEEL PRINTER

Save $240 off list ONLY ~~$379~~

Printout quality need not be sacrificed simply because of cost. Not only does the HR-15XL give you daisywheel printing at a price that's unbeatable, but added built-in attractions such as a 3k memory buffer (5k optional) for smoother printing and text reprinting to reproduce originals comes standard. Remarkable features such as two color printing and shadow printing gives your letters that added touch of importance. To increase the versatility of the HR-15XL, **brother** has an optional KB-50 Human Engineered typewriter keyboard to turn your HR-15XL into an electronic typewriter with automatic correction capability. Since the HR-15XL is a result of **brother's** advanced technology gained by long years of experience in the electronic office machine field it embodies such welcomed features as bi-directional 17cps printing, proportional spacing, automatic underlining, and super and sub script capability. Supplied either with Centronics parallel or RS-232C interface, the HR-15XL is compatible with most all small computers available on the market. Such options as the cut sheet feeder and tractor feeder offer further versatility to the HR-15XL — in a class way ahead of the rest.

NEW

Get the ultimate performance in a low cost daisywheel printer with. . .



brother HR-10 DAISYWHEEL PRINTER

Save $270 off list JUST ~~$259~~

The NEW **brother** HR-10 gives you superb quality and advanced technology from the company that has long years of experience in electronic office machines. The HR-10 is not only a high quality unit but a printer that will last with a snappy 120 word per minute print speed. It uses the renowned **brother** cassette daisywheels for ease in changing and the **brother** mess-less ribbon cassettes. And with the text reprinting feature you can set the HR-10 to continuously print out whatever is stored in the 2k memory buffer — all this at the touch of the front panel control. Control codes emulate Diablo 630 codes for universal compatibility with most software. Other standard, time-saving features include super and sub scripting, automatic underlining, and bold printing giving your printout a professional quality cleanliness. The HR-10 is capable of printing most 4 part forms and accepts a paper width up to 11½ inches. This new addition to the **brother** HR series represents an outstanding value for a personal daisywheel printer.

Make your office beautifully efficient with. . .



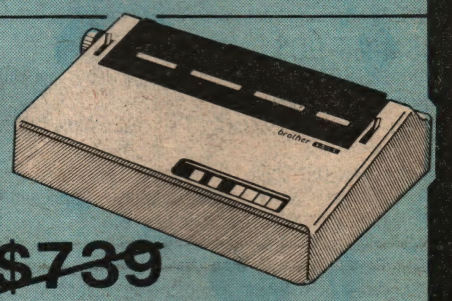
brother HR-25 DAISYWHEEL PRINTER

Save $395 off list ONLY ~~$499~~

brother's HR-25 daisywheel printer has been specially engineered to keep pace with your high volume while producing clean, clear pages of the most beautiful letter quality. Since the HR-25 incorporates a 3k buffer and can print out bi-directionally at a rate of 23 cps, output will never lag behind demand. Once into the buffer, information will be held for repetitive printout with the text reprint function — originals can be produced without end. Previously if you desired to stress certain areas of a text you had to underline the area or type it in uppercase letters. The HR-25's bold type function and red color printout make those stress points literally jump off the page, an especially welcome feature for important reports and letters. Character pitch is selectable among the settings of 10, 12, and 15 positions per inch in addition to proportional spacing. Other features such as super and sub script, auto underlining, carriage skip movement, and easy drop-in ribbon cassettes and daisywheels put the HR-25 ahead of the competition. It is equipped with either a centronics parallel or an RS-232C serial interface and DIP switches conveniently located for easy access, the HR-25 is easily adapted to your computer system. With **brother's** renowned reliability and easy add-on accessories (cut sheet feeder, tractor feed) the HR-25 will increase your office efficiency to unexpected levels.

Free EXCLUSIVE 1 Year Direct Replacement Warranty on Selected Models

For the high output office get the. . .

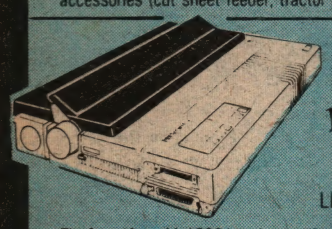


brother HR-35 DAISYWHEEL PRINTER

Save $495 off list ONLY ~~$739~~

One of the main concerns in a high output office is putting out the work required without concern. **brother's** HR-35 will not only print out whatever is on your word processor's mind with the finest daisywheel beauty, but will print it out with a speed (32 cps) and accuracy that will keep your work moving in the right direction. Because the HR-35 incorporates a big 7k (23k optional) buffer memory, your computer will be free for other operations almost as soon as you give it the print command. And that buffer won't stay full for long, thanks to HR-35's 32 character per second print speed and bi-directional logic seeking carriage movement. But the HR-35 does not give up efficiency for speed. Since the printer head comes to a full stop at each strike zone, the high quality of the daisy wheel is taken full advantage of. HR-35 presents you with a host of other welcome features such as two color and bold printing, just the thing to make your text stand out. Extras include super and sub script function, auto underlining, proportional spacing, text reprinting, clear buffer and easy to use front panel control for all the main operations. HR-35's back panel allows either centronics parallel or RS-232C serial interface connection. DIP switches are easy to access and attachable options such as the tractor feeder and cut sheet feeder offer increased utility. And it goes without saying that the HR-35 uses exclusive **brother** daisywheel cassettes and ribbon cassette systems for simpler, mess-less changes. **brother** HR-35, a high output printer.

Our choice as the best business printer buy in the U.S.. . . .



NEW **brother M-1509**

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LIST $549

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The **brother** M-1509 is a dot matrix printer designed to offer reliability, economy, and quiet, easy operation to users of personal or small business computers. Normal print speed is a fast 180 cps (pica), but the M-1509 also provides handsome Near Letter Quality printing at 45 cps. A variety of character sets are available, and the high-density bit image capability produces impressive graphics.

The M-1509 also incorporates a number of cost- and labor-saving features. The large memory buffer releases the computer for other tasks while printing, an optional cut sheet feeder reduces paper-handling time, and the one-inch paper cut function economizes on paper. In addition, the M-1509 is supplied with character sets and control codes compatible with those of the IBM PC and the Epson FX series printers, for easy interfacing with a broad range of computer equipment.

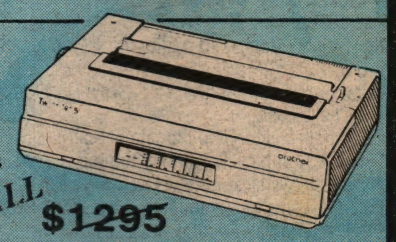
Above all, the M-1509 is designed for people. It is exceptionally slim and light, with conveniently consolidated controls, allowing it to fit easily into a fully-equipped work station without wasting either office space or valuable operator time. It is also quiet – a fact which, though often overlooked, is of crucial importance in maintaining an efficient, industrious office environment.

Get the first printer in the world to offer both daisywheel and dot matrix printing with. . .

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Twinriter 5

Save Hundreds CALL



Two Printers In One

$1295

Now you can have 36 cps letter quality printouts for word processing requirements and 140 cps dot matrix speed for data processing or first drafts, without having to buy two separate printers. And that's not all. The **Twinwriter 5** is designed to be compatible with the new requirements of most integrated software systems. This means that it fits right into a comprehensive office system without special programming.

Switching between the two printing systems can be accomplished using ESC control codes from the host machine for unlimited ability to produce graphics or special characters not included on the daisywheel being used. Even the print quality of the dot matrix characters are just a shade this side of letter quality. A choice of six types of dot densities provides graphics that are sharp and clear. Illustrations, graphs and charts can be easily inserted in text without having to draw them in after printing of the main text.

And, of course, the **Twinwriter 5** also features all of the fine functions that have made **brother** printers the choice the world over. Bold printing, superscript, subscript, auto underline, proportional spacing, text reprinting, clear buffer and an easy-to-use front panel to control all major functions. Outstanding cost performance adds up to a savings throughout the entire life of the unit. Economical, compact and versatile. . . the **brother Twinwriter 5** daisywheel/dot matrix printer.

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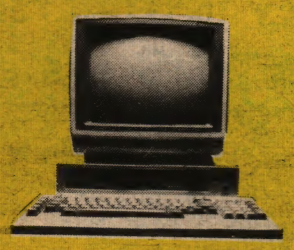
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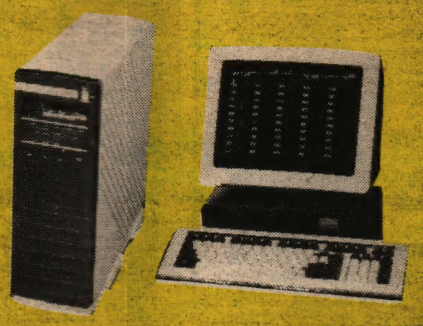
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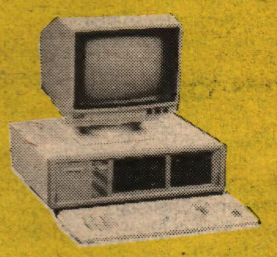
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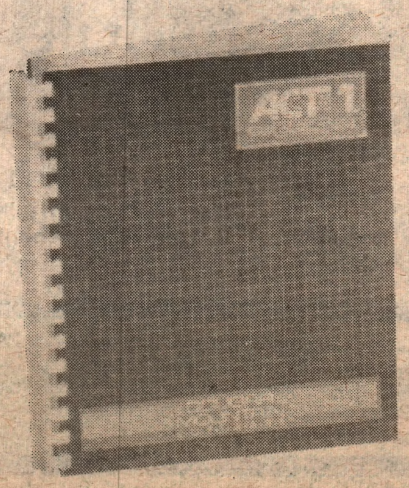
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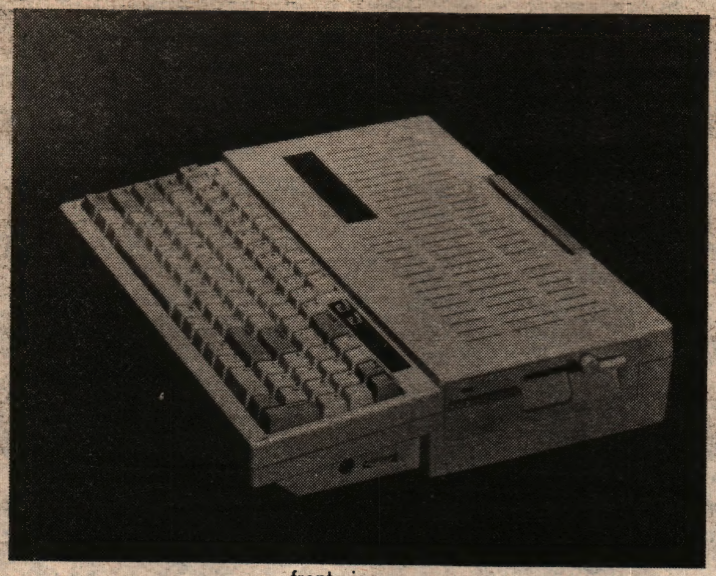
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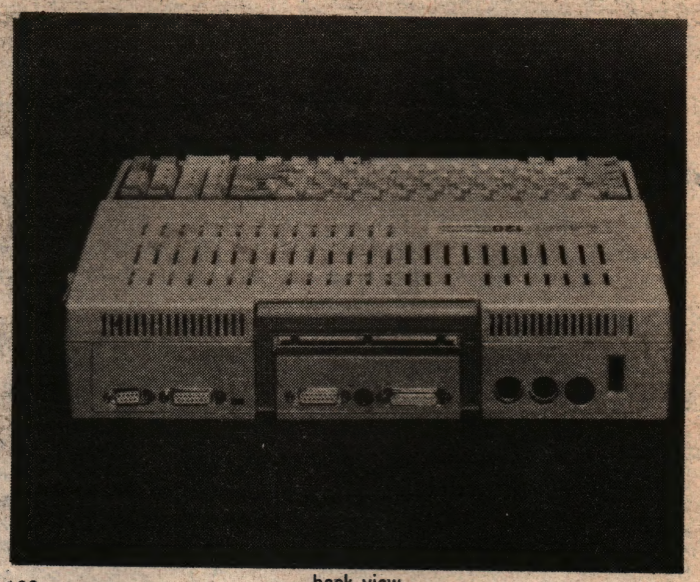
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IIc Or Not IIc
How Compatible Is The Laser 128?

by *Computer Shopper* Staff



front view



back view

Laser 128

Not all clones are copies of the IBM Personal Computer, the popularity of Apple and TRS-80 computers has often tempted the clone makers. The few TRS-80 clones have died with the lowered cost of the originals and the general lack of interest in 8-bit Z-80 machines by the public. Apple Computer has successfully fought most attempts to import pirate copies into the United States. It was a hard fight and really only won when the pirates lost interest in copying Apple II and turned their attention to the IBM PC. Apple also fought Franklin Computer into bankruptcy, although a reorganized Franklin is back with a non-infringing computer.

Video Technology Computers Ltd. of Hong Kong and its American branch, Video Technology (USA) have manufactured and legally imported Apple II clones for some time. The Laser 3000 is sold by Midwest Micro-Peripherals in this magazine as MidPro 3000 in a package including software.

Now Video Technology Computers Ltd has produced the Laser 128, an Apple IIc clone with features not included in the orginal IIc. This new computer has passed the U.S. Customs inspection and is allowed to be imported as non-infringing on Apple copyrights. The marketing of Laser 128 is being promoted by Video Technology (USA) with Central Point Software Inc, well known for Apple II software.

We received a Laser 128 from Central Point to test a few months after we had seen the unit at the Consumer Electronics Show in Las Vegas where we were impressed with it. It arrived in a neat carton which boldly stated that: Your Laser 128 computer is compatible with nearly all software written for Apple II Plus, Apple IIe and Apple IIc." This is a bold statement, but there is even a bolder one on the front of the carton which claims that thousands of the world's most popular Apple II programs will run on the Laser 128. In addition you can also run CP/M programs by the addition of a simple plug-in cartridge.

Our mission was to determine the truth of these claims and to review Laser 128 for our readers. This is our report to you on our findings. In evaluating the results, bear in mind that most of the tests were performed by people who are dyed- in-the-wool Apple II fanatics, who turn a jaundiced eye upon anything not bearing the bitten Apple logo. Stan Veit, our Editor, played the part of a perspective buyer (he uses IBM PCs, but has a relationship with Apple going back to the Apple I).

When you remove the Laser 128 from its carton you see a neat keyboard computer very much like the Apple IIc, but a little larger. Instead of Apple white it is colored "IBM grey" with a gold Laser 128 nameplate. There is one obvious departure from the IIc layout and that is the 50-pin expansion connector emerging from the left side of the computer. This connector will accommodate most Apple II-type expansion boards and functions as Port 7 (Slot 7 in the Apple II scheme of things). This is a really nice thing to have available and is a plus in the Laser 128 design.

The connectors on the rear panel reproduce the ones on Apple IIc. Looking at the rear of the computer, on the right is a 9-pin D-connector socket used as a Mouse/Joystick port, then a 15-pin D-connector socket used as a parallel printer port. A small slide switch is provided to convert the keyboard from the standard QWERTY design to the alternate Dvorak layout. If this is used you have to paste new letters on the keycaps. We found it almost impossible to remove the caps so that we could switch them. There is a Dvorak layout in the User's Manual. The next 15-pin D-connector socket is for the video expansion port. This lets you connect the Apple LCD flat panel display, or RGB monitor. In other countries the PERITEL video signals are also on this port. Next in line is another 19-pin D-connector socket for the external second disk drive. The Modem, and Serial Printer port are on DIN connectors while the Power connector is a male DIN type connector to preclude plugging it into the wrong socket. The ON/OFF switch is last in the row. In the center of the handle is an RCA type socket for composite video output. No RF modulator output is provided for use with a TV set. If such use is desired, the modulator for the Apple IIc will work with the Laser 128. It would be connected to the composite Video Out connector.

On the bottom of the Laser 128 are two recessed switches. One is for selection of 50Hz/60Hz and the other is marked Mono/Color but is not explained in the User's Guide. There is also a recessed screw-driver adjustment provided through the bottom of the computer. This allows for adjustment of the built-in disk drive when alignment becomes necessary.

Turning the computer over and looking at the keyboard, you will find the 90 keys arranged in the Standard arrangement (QWERTY) with a row of 10 function keys at the top. The problem with these function keys F1 to F10 is that they are assigned as Control characters for example: F4 = Control C. There is no way they can be reprogrammed by the user. A numerical keypad is provided although there is little room between keys, however this is a plus for the Laser. Above the keypad section there are three switches, one for 40/80 characters, one for Parallel/Serial output and one for Color/MONO selection. There are also three indicator lights, one for POWER, one for DISK and one for CAPS INDEX.

On the left side of the keyboard, there are ESC, TAB, CTRL, SHIFT and CAPS LOCK keys. These are all oversized, except the ESC key. The control keys are colored a dark grey for easy identification. The RESET key is a small square key placed above the ESC key. This is a position we did not like. The bottom row of keys contains the cursor control arrow keys and the Laser equivalent of the "Open Apple, Closed Apple" keys. In this case the open and closed triangle are used. In general, the keyboard was one part of the Laser 128 that nobody liked. It is a shame that this vital part of a computer is often neglected or downgraded in quality. Since it is the major man/machine interface, the keyboard should be the last place a manufacturer seeks to save money.

Tucked under the keyboard on the right side is an audio jack for an earphone. When the mini plug for the earphone is inserted into this jack, the sound from the built-in speaker is only audible in the earphone. There is also a volume control alongside the audio jack.

The 5 1/4" disk drive is also mounted on the right side of the computer. There is also an indicator light alongside the disk drive slot. The drive is designated as "Port (Slot) 6, Drive 1." When a second drive is connected to the external drive connector on the rear panel it is designated as "Port (Slot) 6, Drive 2."

The power supply is external to the computer and plugs into the POWER port on the rear panel. It can sit on the floor and plug into a wall socket. It is rated at 38 watts and carries the UL Lab Approval.

This then is the physical description of the Laser 128, in general it is a neat, compact, easy to carry and powerful machine. It has 128K of RAM built-in and has provisions for expansion. Outside of the keyboard, we all liked the physical make up of the computer, especially the expansion connector on the left side. An expansion box is available for the Laser 128 which splits the expansion slot in two slots 5, and 7. This would seem to be a necessary item if the computer is to be used with many cards. There is some danger of plugging the cards in backwards in the expansion slot. Care will have to be taken not to do this, or not to remove the card with the power ON. The result might be fatal to your computer.

The physical form of the computer is only a small part of any evalution, it is the software compatibility that counts.

The first tests of software compatability determined that both DOS 3.3 and PRODOS ran on the machine. The main barometer for Apple compatibility these days is Appleworks since this has become almost the sole application for some users. Appleworks ran with no problem. We then took the Laser 128 to Space Coast Systems to see if their Challenger hard disk would run on the Laser. Again we were successful. The Sider hard disk will also run on the Laser. We were becoming more impressed with the machine all the time. In all we were able to ran much of the software we tried. Apple Pascal run without problems. The only thing we could not run was a 6502 Assembler for Apple II and programs that normally run on Apple's 80-column card. In addition programs that called routines in

continued on next page

The Re-Birth Of The Home Computer

by Stan Veit

Back in the ancient days of 1976 we had a standard answer for anyone who asked, "what can you DO with a home computer?" Our answer was, "its uses are limited only by your imagination." Of course this answer was untrue because there really was very little you *could* do with one of our early microcomputers. However when the low cost, "home computers" appeared on the scene, the advertising copy writers described them as "intelligent machines" that would do all kinds of wonderous things in your home besides teaching your kids to be "computer literate" so they would not grow up to be ditch diggers, or house maids. I will never forget the sight of that poor young man in the Commodore commerical, returning from college, alone on the train, because he couldn't make it with computers. If he only had learned to use a Commodore 64 he would have made the Dean's list. Well people bought this kind of advertising hype up to a point, and they bought millions of home computers, books and magazines. It was not only the microcomputer manufacturers that contributed to this flood of home computer frenzy, IBM also produced the PCjr and their ads gave credence to the idea of a computer-in-every-home. Then the market turned sluggish because people were discovering that a home computer required a lot of learning to do anything and that usable software was scarce. This turn down in sales triggered the 1982/1983 price wars and the end of the home computer bubble. TI and Timex left the field, IBM gave up on the PCjr, Atari was in trouble and Adam died. The same newspaper "experts" and consumer magazines who created the concept of a "Home Computer" now said it was "dead" and millions of the machines were thrown in the closet. The fickle public went on to video cassette recorders as the next technological craze.

However, something happened on the way to the cemetery, it was discovered that the victim was not dead and that it was a case of mistaken identity. What was called "Home Computer" was really a low-cost personal computer and was still selling.

Radio Shack and Apple never stopped selling computers, but they also never promoted the "computer-in-every-home" hype, instead they sold their machines to every school in the United States.

In time, even Commodore and Atari, the biggest offenders in the baloney blitz, toned down their ads and concentrated on providing software for their machines. Radio Shack went from the TRS-80 Model I to the Model III and provided the TRS-80 color computer as a low cost entry-level model.

By now the kids who had learned about personal computers in school were growing up and they got their parents to make the investment in a computer for use at home. The software industry had developed beyond games and with the advent of low cost floppy disks and cheap printers for small computers, they provided real programs for the low cost machines. Look at the programs available for Commodore 64/128, for Color Computer and Atari machines and you will see a variety of word processors, spreadsheets, data base managers, graphics programs, desktop publishing and real accounting programs. Today, you will find almost every type of software available for low cost personal computers that is available for the more powerful PCs. They may work much slower, but they are available at low cost and they work. The low cost home computer has finally come into its own. Millions of people are using them for real tasks on a regular basis.

If you still believe in the death of the "home computer," then it has experienced a "re-birth" as evidenced by the numbers purchased by the public. Commodore has sold about 5 million C-64 computers worldwide, a good percentage of them in the United States and Canada. Commodore has already sold about 1/2 million C-128s and expects to sell millions more. Not all of them will replace C-64s, since many of the owners will find uses for more than one computer. These approximate numbers come from Commodore who does not normally release these figures, (neither does any other manufacturer). I called Ed Juge to discuss the population of CoCo and ran into the same company policy problem. Ed told me that an outside source had put the number at around one million and someone in Radio Shack had said that it was "pretty close." However, Ed was not certain because RS was supposed to have sold 200,000 during their before Christmas sales last November. If that number is correct than the total number of one million must be very low. No matter what figure you use, Radio Shack has sold a lot of Color Computers to say nothing of their Model III and 4 TRS-80 Computers which are priced just above the home computer level.

An Atari spokesman said that they had few records of the "old Atari" to go by, but estimated that there were about a million and a half 8-bit Ataris "out there." He said that the 8-bit machines were still selling well but with the decrease in price of the 16-bit ST family, the more powerful ST would take over this year.

You will notice that I have not included the Apple II which has always been priced above the level of the "Home Computers." However, a significant percentage of the Apple II computers are used for home applications and must be counted. Then there are the IBM PCjr and other orphan computers.

When TI bowed out of the "home computer" business (they invented this unfortunate name) they left behind one of the largest population of computers ever made. For a "flop" the TI 99/4A was a popular one! While many of the units were thrown into closets and forgotten, most of them are still in use by their loyal owners. The owners of the first Timex/Sinclair computers ZX-81 (Timex 1000) have largely given up on them, but the owners of the Timex 2068, Sinclair Spectrum and QL computers treasure their machines and are as loyal a group of users as you will find in the industry.

The home computer has blended into the personal computer used in business and the two will become one type of machine with the only difference being the type of software they run. Look in the pages of *Computer Shopper* and observe that a PC, or XT clone can be bought for less money than it takes to put together a "home computer system. To counter this, Apple, Commodore and Atari have reduced prices of their flagship machines. By next year the home computer user will purchase an 8-bit machine that costs less than $500, complete with disk drive and a printer. For the advanced home computer user, 16-bit machines with advanced graphics will be available for under $1,000.

Software has almost caught up to the present trends. Prices of word processors, data bases and spreadsheet systems as well as integrated software systems have been reduced to levels affordable by every home user. In the case of software that has retained its high (business market) price, many alternate programs are available for less than $100.

Telecommunications and low cost computer networks have provided an electronic community accessible to any computer owner with a low cost modem. These networks have become the distribution channel for information and public domain software. The home computer owner no longer feels alone in the quest for help with the computer and software, a simple telephone connection provides expert assistance and the sense of belonging to a nationwide group with similar interests. This electronic community on the networks and bulletin boards was something never dreamed of by the early computer hobbyists. It just grew because both the need and the technology were there at the same time. Today it is the vital link that ties home computer users together and assures that home computers will never die, they just go on-line. ●

IIc or Not IIc
continued from page 7

the Apple ROM would not run. This is of course a general rule with all clones where any software that calls for routines in ROM will never work on a clone unless the ROM has been duplicated (a bad NO-NO).

Having been successful in operating the Laser 128, we turned it over to Philip Chien who writes many of our Apple reviews and is considered an Apple II expert. The following is his report, which has been edited to remove the same statements made in this article.

What makes an Apple IIc an Apple is the firmware, the built in language and operating system. With the exception of the very first original Apple IIs, every member of the Apple II family includes Applesoft BASIC in ROM, and for a machine to be Apple compatible it must be able to run Applesoft programs.

The Apple III and some clone Apples load in Applesoft from a diskette and then write protect it. With other machines empty sockets are provided for Applesoft, and the customer must obtain a set of Applesoft ROMs separately. Other manufacturers provide an alternate language, such as Forth, instead of Applesoft. Several manufacturers will provide direct copies of the Applesoft ROMs, or ROMs with very little modification in order to make sure that their machines are totally compatible with Apple's. These machines are usually confiscated by US Customs, or the manufacturer is sued by Apple Computer for copyright infringement.

Vtech, the manufacturer of the Laser 128, took a different route. Applesoft BASIC is based on the 1977 version of Microsoft BASIC. Vtech just licensed out their own copy of Microsoft BASIC, and enhanced it to make it keystroke compatible with Applesoft. Contrary to Vtech's ads, the BASIC is not a 32K BASIC, it takes up 10K, the same size as Applesoft. The other 22K is I/O routines, the system monitor, and the support for the I/O ports. It is NOT a 32K BASIC any more than an enhanced IIc with the 32K Unidisk driver ROM has a 32K BASIC. The only enhancement to Applesoft is that the Laser BASIC will accept lowercase commands. None of Applesoft's bugs have been removed. Unfortunately, Vtech apparently decided not to correct the bugs, or add any extra commands like double-HIRES graphics or functions like double precision math to make sure software compatibility. (They also had to stay within Applesoft's 10K space limit.) Overall the BASIC is about 95% compatible with interpreted (uncompiled) Applesoft programs.

The Laser's system monitor isn't as easy to use though. Many routines in the Apple monitor are not available

continued on page 10

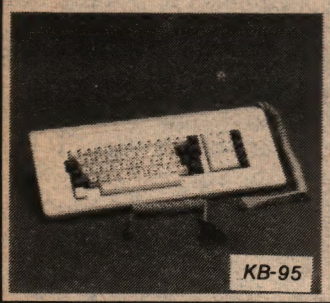
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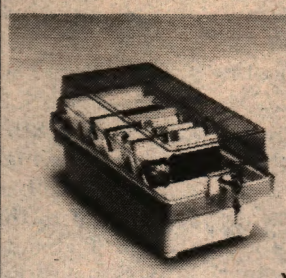
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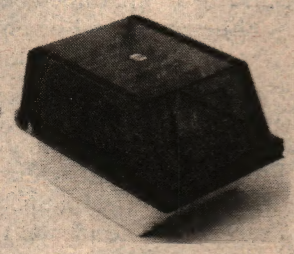


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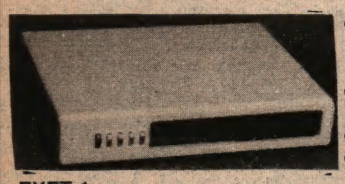
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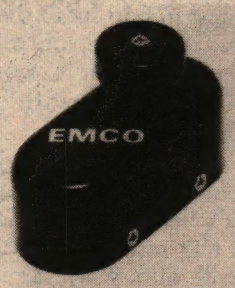


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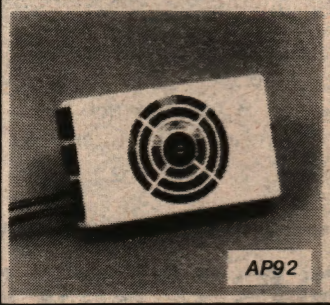
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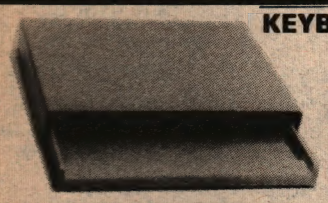
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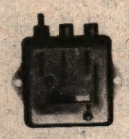
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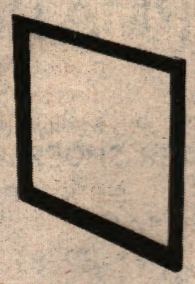
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IIc or Not IIc
continued from page 8

on the Laser 128, and any programs which call those routines will fail. On any Apple with an Autostart ROM a CALL-1184 from BASIC (or JSR $FD60 from machine code) will print "APPLE][," "Apple IIe," or "Apple IIc" depending on the particular Apple. On many imitation machines the command will produce "COMPUTER" or another title. On the Laser 128 the same command will stop the program. The Laser monitor uses sub-standard I/O routines, and programs which search for an interface will fail. Many programs which do not use the standard "PR#" commands to access I/O devices will get very confused, and may not work either. Any program which calls Apple's AUX memory handling routines will also fail.

From a software point of view most programs which do not call internal ROM routines will work without any problems. Present versions of ProDOS think that the Laser 128 is a 128K Apple IIe. Future versions of ProDOS may not be as tolerant.

Most popular programs, including Appleworks, Applewriter, AE Pro (with an external modem), and most games will work. Some programs may have to specifically setup (e.g. to set up AE Pro tell it that you have an Apple IIc with an external modem attached to PORT 2). *Applesoft compilers will not work, and programs which are compiled probably will not run.*

From a software point of view the Laser looks like an Apple IIe with most of its slots filled. On the Apple IIe switches on the various cards are used to setup default parameters for each accessory. An Apple IIc assumes that you have a 9600 baud serial printer and 300 baud modem attached. If you have different accessories you boot the IIc System Utilities diskette which configures your IIc's ports. The Laser 128 assumes, like the Apple IIc, that a 9600 baud printer and 300 baud modem are attached. If you have different accessories then you must hold down the "F" key while typing CTRL-RESET. A menu will show you the various setup parameters. The parameters are not saved when the power is turned off, and you must reset the parameters each time you power up your Laser, unless your program knows how to set the parameters itself. Once set, the parameters usually do not have to be reset, although various programs may accidentally erase your parameters. If you use a standard serial or parallel printer and a 300 baud modem, then you won't have any problems. If you have a faster modem and your terminal program will automatically set up the IIc's serial ports then you still won't have any problems. If your printer can't be setup for 9600 baud, or you have a fast modem with an older terminal program, then you will have to setup the Laser each time.

The Laser will not accept internal IIc accessories, like the Z-RAM (April '86 *Computer Shopper*) due to its different design. It does however include an internal memory expansion port. Nothing is available for it yet, but if there is enough demand a future internal memory expansion board may come out.

The Laser 128 is not an easy machine to get into. I found it very difficult to open the machine to get internal access to the expansion port. The motherboard and drive are protected with an aluminum RFI shield. Unusually the ROMs are quite easy to get access to. A small access panel on the bottom of the Laser covers the two ROM locations (probably so that the machines can be imported to the US without the ROMs, and then the ROMs are installed in the US). Internally all ICs are soldered directly to the motherboard, and there is a lot of hand soldering.

The expansion slot on the Laser 128 is compatible with most, although not all Apple expansion cards. The -5V, INT, and DMA signals are not available, and cards which use those signals will not work properly. INT is the most important of these three signals. External clock and modem cards will work for simple programs, but will not work with sophisticated programs.

The video port on the Laser 128 is not totally compatible with the IIc — it's better. It will accept the Apple LCD screen and RF modulator. It will also work directly with RGB monitors, where the Apple IIc will not work without an adapter box. RGB monitors do require special cables though, standard Apple RGB cables will not work.

The Parallel port on the Laser 128 switches in, and electrically replaces the serial port. A special cable is required since it uses a DB-15 connector. The built in firmware does not include any graphics routines, an extra program must be used for graphics dumps. The parallel and serial ports are not software selectable, but the front switch makes it fairly easy if you want to connect two devices at the same time.

Most external hardware designed for the IIc will work with the Laser 128 without problems. Most incompatibilities will be due to physical problems. The ProModem 300C will not work because of the shape of the case, and other devices which must be plugged into more than one port (e.g. the Serial port and Joystick port at the same time) will not work. An exception is the Unidisk 3.5, which requires a special driver ROM on the IIc. That driver is not built into the Laser 128.

The Laser 128 comes with a 180 page manual covering how to use the machine, documentation on the expansion ports, and the syntax for the BASIC commands. A separate technical manual is supposed to be available, but I did not get a chance to see it. Central Point Software also gives you a copy of their Copy II Plus program with the Laser 128.

Conclusions

The Laser 128 lists for $479. However Central Point Software is selling it directly for $395 until a dealership network is set up.

Look at what you are getting for the money, A neat Apple IIc clone with a built-in disk drive, 128K of RAM and all the I/O ports you are likely to need. This includes a parallel port as well as two serial ports. The unit is expandable and you can add a Z80 cartridge to run CP/M. You can also add an extra disk drive for less than $150. This is a better buy than a Commodore 128 with a disk drive. One thing that the Laser 128 User's Guide does not talk about is DOS of any kind. It is as if the drives worked by magic! It is stated by NOT being stated that you have to go out and buy your own DOS. Apple IIe and IIc now only come with PRODOS so AppleDOS is now available to purchase from Apple Dealers. You can also purchase PRODOS and Apple Pascal. Remember to add the cost of this vital software on to your purchase price as well as the cost of your monitor, printer and cables.

To answer the question at the start of this article, Laser 128 is NOT IIc, but it is very close to it. Not quite up to the mark in some ways, the same in a few others and even better in a few details. For the price it is a good buy, certainly a better value than any Apple clone we have seen before.

For additional information:
Video Technology Computers (USA) Inc.
2633 Greenleaf Ave.
Elk Grove Village, ILL 60007
(312) 640-1776

or

Central Point Software
9700 S.W Capitol Highway, Suite #100
Portland, OR 97219
(503) 244-5782.

Table 1: Laser Port Assignment

1	Parallel or Serial port (usually for a printer)
2	Serial port (usually used for a modem)
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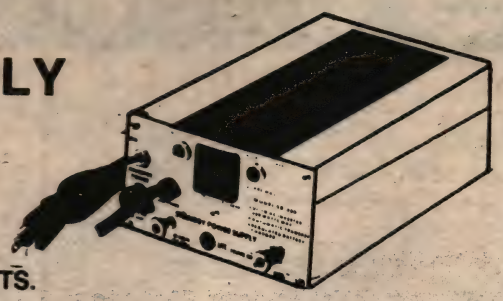
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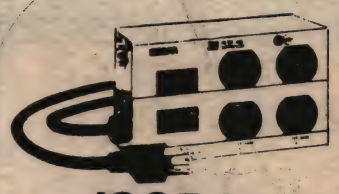


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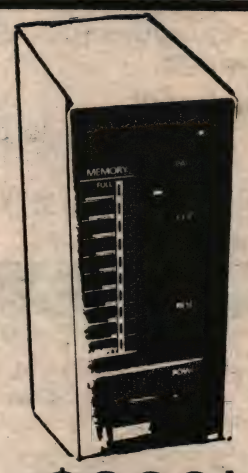


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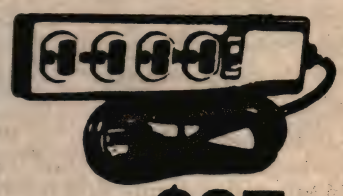
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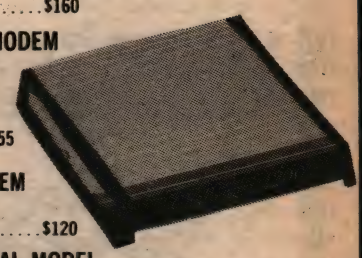
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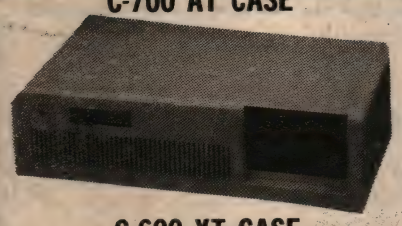
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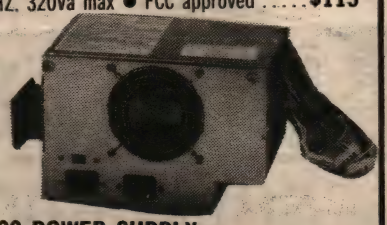
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AT 200 POWER SUPPLY

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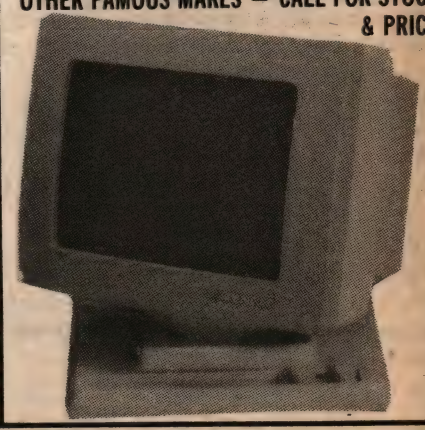
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Editorial

By Stan Veit

I read an article in *The Wall Street Journal* concerning The Leading Edge company and their relation with computer suppliers and dealers. It seems they have had problems, some of which ended in court. I am not interested in this aspect of their business since I have no contact with it. However, I am concerned with their relationships with the people who buy and use their computers because our readers write me about such problems. Strangely, I have never received any complaint regarding the computers they sell, all of the users seem to be very happy with the machines. The problem seems to be with Leading Edge and the way they deal with customers. After reading *The Wall Street Journal* article I gained some insight into the reasons for this. It stated that the man who runs Leading Edge uses the merchandising methods of the garment industry in selling computers. Perhaps this accounts for the merchandising success of this company and also in their way of dealing with the end user. Leading Edge expects their dealers to cope with service problems. Other manufacturers and importers use this same method of service but it is successful only as long as the company supports the dealer with parts and pays for the warranty work. The *Journal* article said that some dealers claim that Leading Edge fails to support them, but I have no evidence of this. I do have many letters from end users saying that they love their computers but if anything happens they are on their own with little support from dealers and none from Leading Edge.

Recently in an issue of *PC Magazine*, Paul Somerson asked the question "How much is the IBM logo on your computer worth?" Paul concluded that it was worth a great deal. This is because a computer is not a garment, it is a sensitive electronic machine requiring care and attention and the logo represents a pledge between the seller and the buyer. I agree with Paul but I would like to extend the value of the logo to many other brands. You are just as well off with the Compaq, ITT, Zenith, TI and many other brands I could mention. It also is true of many mail order vendors who support the equipment they sell after you buy it. Frankly, I also have no objection to a vendor who before the sale, tells you, "I am selling you this at a very low price, therefore do not expect any post purchase support or service." That is what Sinclair did when he first came out with a computer for under $100. It made a lot of people angry but Sinclair never lied about it.

A lot of large corporate purchasers of PCs are discovering that the PCs they bought have disk drives or boards that are not "original equipment," that is they were bought by the dealer and added to a lower capability machine to fill a contract requirement at a lower price. Some of the boards are Asian clones and allow the complete unit price to be greatly reduced. The corporate purchasing departments are learning that they better specify the exact contents of every box that they order. The funny part of the whole thing is that no one detects that there is any degradation of performance until something goes wrong and must be fixed. Usually this happens long after the end of the warranty period. Off the record, some dealers say they substituted hard disk drives in ATs to avoid trouble and make deliveries on time.

Never count on long term, continuing support. In this business, it is here today, gone tomorrow. You can only count on continuing support from the biggies and you won't get it for nothing. You must pay for the little logo in the corner and all it represents. Not only is there no such a thing as free lunch, there is no "lifetime guarantee."

Knowing this you can be an intelligent buyer. Buy the unknown clone only if you can take care of your own problems, or if you can get a lot of help from your friends. Your friends are the members of your user's group, or magazines devoted to helping you.

Always remember that the only thing you can count on in the computer world is change. Sure IBM will always be here, but try to get help, parts or software for your IBM 5100. (The world's first personal computer.) Although someone may have a working unit, it is an antique, not an office machine any longer.

I have managed to keep my three year old IBM PC fairly up to date by changing boards, but in spite of this, my wants are starting to exceed its capabilities. In the same way I outgrew my beloved SOL, my Z80 CP/M machine and my Model 1, TRS-80. Sooner or later I will replace the PC, but I still don't know with what.

I am starting to get a lot of letters from our readers about PC Clone Confusion. We will try to keep the subject alive and to help with your problems. Keep writing to *Computer Shopper*, and we will try to help. I am trying to set up a SIG on one of the networks for this purpose and the project is going well. I ask you to write rather than call me with PC Clone problems. I can not help you on the phone, only being an Editor, not a data base, or expert system. What I am trying to do is find answers and that takes time and effort. Unfortunately, No, or No Way, is also an answer in some cases.

I just returned from the 11th West Coast Computer Faire in San Francisco and although I found it less exciting than when Jim Warren ran it, I must commend the Interface Group for their effforts in making this a good show. I feel that they will restore all of the fun and tradition of the Faire, which has always been a seed bed for new and wonderous things in personal computers. My show report is elsewhere in this issue.

I Shot The Computer Gator!

Everyone was after me to start a gossip column in *Computer Shopper* so I finally gave in and last month we published The Computer Gator, a gossip column. Well it seems that the Gator did not check its facts too well. I talked with Ed Juge about the prediction that Tandy would come out with an MSDOS lap top and was told, "Not in the works" at least not this year.

The Gator also talked about a New York flea market operator who was supposed to be in trouble with the Feds over lack of FCC approval for clones. Again the facts were all wrong. I got a call from Don Johnson who identified himself as the flea market operator. He said the FCC did talk to him, but it was a mistake. The "Clones" were real Osborne Vixen computers and Don is an Osborne dealer (or WAS since Osborne bit the dust, for good this time.) Sorry about that Don. Mea Culpa.

I shot our Computer Gator, although computer gators are a very rare breed. No more gossip in *Computer Shopper*. ●



West Coast Computer Faire Report

On April 3, 1986 the Computer Clan gathered for the 11th time in San Francisco for the West Coast Computer Faire. This show originated by Jim Warren has been one of the industry incubators for original hardware and software. The small booths and free user group exhibits have provided a place for ideas to start and grow. The seminars have also been platforms for some of our most thoughtful people.

Jim Warren sold the show to Prentice Hall who operated it for several years. They tried to retain the pioneering flavor of the Faire but never were quite able to fit it into their corporate structure. Finally Prentice Hall itself was merged with Simon-Schuster who recognized that this show was not in their business line. They sold it to the Interface Group, producers of the Comdex and Interface Shows who have moved it from its original venue in Brooks Hall to the modern Muscone Center. President Sheldon Adelson, of Interface Group saw this show as a seed bed for new companies that might grow to become the stars of Comdex in the future. This is not so far-fetched when you consider that the founders of Apple got the 6502 CPU that enabled them to build the Apple I when they attended the first Faire in 1976. Other companies who first exhibited at this show were Cromenco, Alpha Micro, Morrow, Vector Graphics, Digital Research, Microsoft and countless others.

This year the attendance for the first two days was not too great but when the weekend came, so did the computer clan. They came from Silicon Valley, the West Bay and all over the San Francisco region. Missing were the east coasters and international visitors . The WCCF used to be a tour for the Japan Computer Club members, but these days the tide runs the other way. We talked with people from IBM's exhibit and realized that IBM and *Computer Shopper* were the sole exhibitors from Florida. The attendance was supposed to be around 30,000 and most of it was on the last two days.

The *Computer Shopper* booth featured our latest issues and Don Lancaster, our Apple Guru who autographed his books and gave advice to all those troubled Apple users who stopped at the booth. I was there for three days and was happy to talk with many readers who came by. During the show Steve Ciarcia of *BYTE* stopped by to meet Don Lancaster in person. They had known each other for a long time via telephone and electronically but had never met face-to face.

IBM showed their new PC Convertible and the PC RT computers plus a lot of new software. Apple was there with a complete line of software and computers. Among those missing as exhibitors were both Commodore and Atari, however they were represented by very strong user group exhibits. In

continued on page 30

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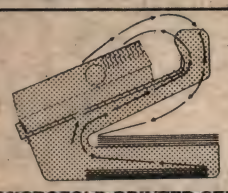
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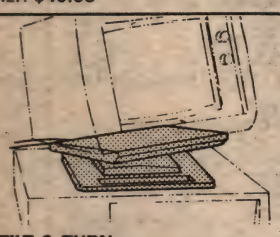
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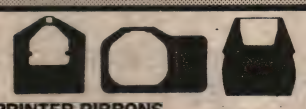
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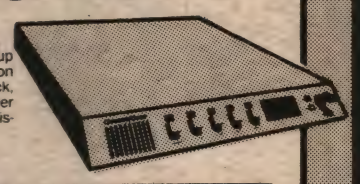
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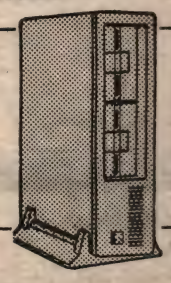


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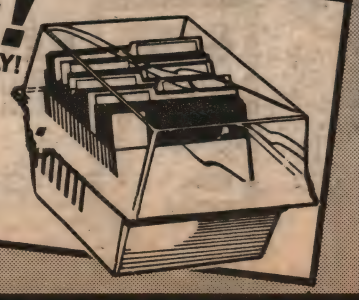
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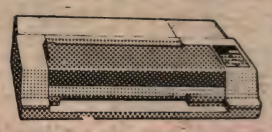
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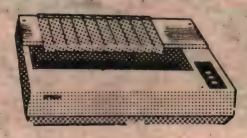
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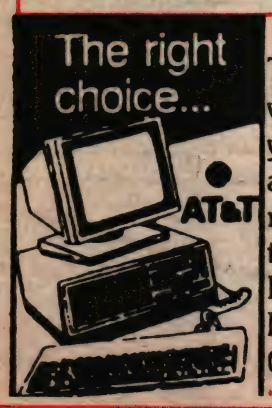
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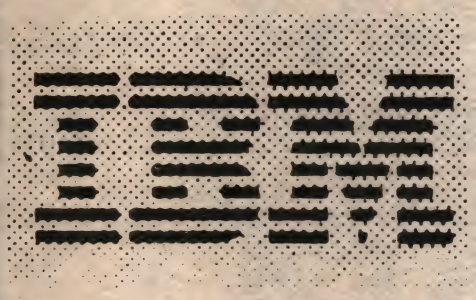
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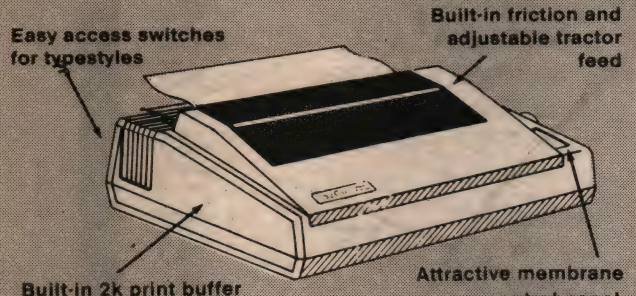
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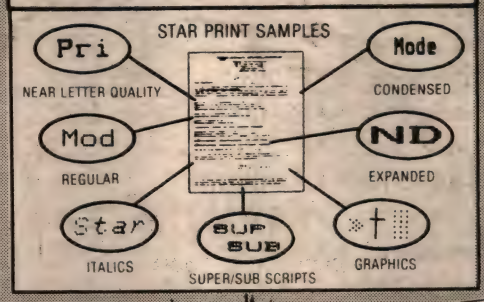


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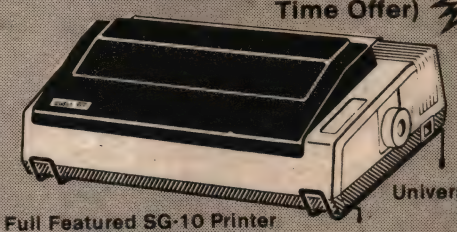
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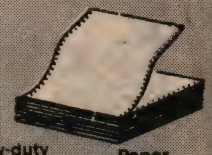
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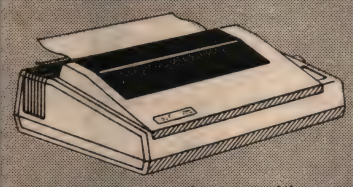
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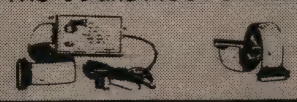
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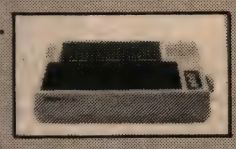
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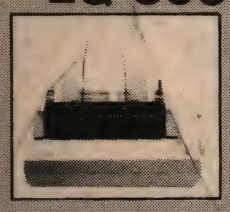


Quite simply the Epson FX-85 is the most intelligent way to print you can find. At a brisk 160 characters per second in draft mode and 32 characters per second typewriter style near letter quality mode, the FX-85 gives you professional versatility. A new 8K internal buffer stores up to 4 pages of data allowing you to print and use your computer at the same time.

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LQ 800 & 1000



PRINT SAMPLE
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Whether you take one home, use it to help run a small to medium sized business, or use them in a corporate environment, the LQ-800 and LQ-1000 make excellent choices for virtually any printing task. You can turn out drafts at high speed, letter quality copy in seconds, or sharp, finely defined graphics. The 136 column LQ-1000 is ideal for printing spreadsheets and financial reports; while the 80 column LQ-800 can handle everything from correspondence to mailing labels. Both come with a 7K internal buffer that stores up to four pages of data allowing you to print and use your computer at the same time. Easily installed optional Identity Modules let you choose between Extended Epson Graphics, IBM Graphics Printer or Diablo 630 code. The kind of versatility a growing business demands. There are also built-in fonts and optional Font Modules for an array of easy to access font styles. The choice is yours.

NEW EPSON FX 286

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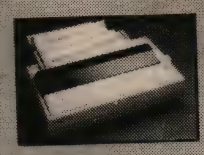
The new FX-286 Dot-Matrix Printer is ideal for use at home, in the office or multi-use corporate environment. You can turn out drafts at high speed. Near Letter Quality copies in seconds and graphics of superb resolution. Standard Tractor Feed and Friction Feed accommodate virtually any type of paper, single sheet or fanfold. For optimum versatility, SelecType gives you numerous typestyles at the touch of a button. The FX-286 uses the industry standard parallel interface and has a dip switch selectable "dual identity." Epson standard code compatibility and IBM® printer emulation. You even get build-in IBM graphics character sets for sharp resolution in graphs, charts and illustrations.

Optimum Versatility:
- Print drafts at high speed. Near Letter Quality copies and superb graphics.
- An 8K internal buffer allows you to print and use your computer at the same time.
- Exclusive SelecType feature delivers numerous popular typestyles at the touch of a button.

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- 10 Pitch
- Bold Printing
- Shadow Printing
- Underline
- Super and Subscript



Productivity is very important to us. How fast are the DX-10, DX-20 and DX-35?
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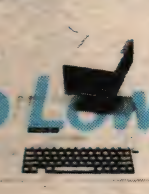


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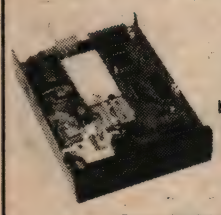
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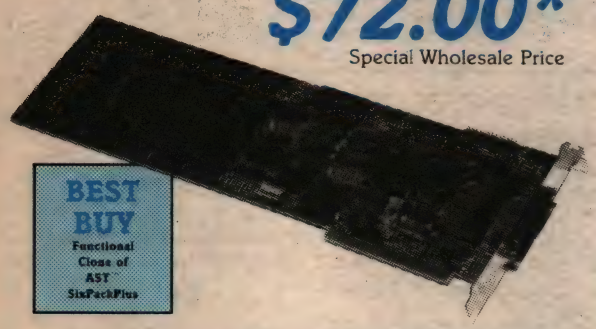
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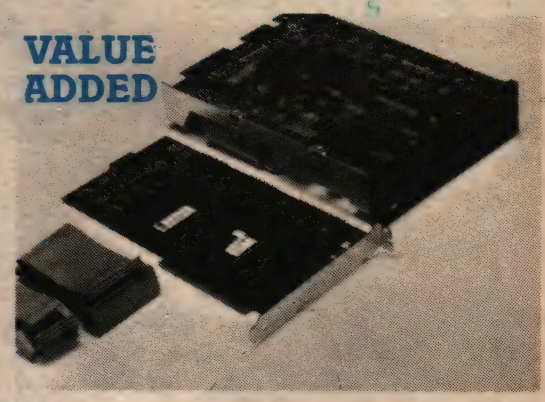
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U.S. Air Force Contract To Aid Writing Programs In Ada

The U.S. Air Force has awarded General Electric a three-year, $2.6 million contract to support the development of a special computer program that will streamline the process of writing software in Ada, the official computer language of the Department of Defense.

The development effort is being funded by the Air Force's Avionics Laboratory at Wright-Patterson Air Force Base in Dayton, Ohio. It is the largest software development contract the Avionics Laboratory has ever awarded.

"This development program is aimed at reducing the cost of future software systems by making Department of Defense programmers more productive and their software products easier to maintain," Dr. Roland W. Schmitt, GE senior vice president for corporate research and development, said.

In the past decade, the GE executive pointed out, the performance capabilities of computers have increased by as much as a million-fold, while those of the people who program them have only about tripled. "If the nation's ambitious initiatives in space and defense are to be successful, quantum gains in programmer productivity must be achieved, "Dr. Schmitt added.

Under terms of the contract, computer scientists from GE's Research and Development Center here and the company's Aerospace Group in Philadelphia will develop an advanced software environment for Ada. The goal is to shorten by at least a factor of ten the time cycle required to write programs in Ada.

Ada has been adopted by the Department of Defense as its standard language for embedded computers (i.e., those "built into" various systems). Its power derives, in part, from a specialized symbolic "shorthand" that increases the amount of work on the part of the computer that each line of programming, or code, can produce.

Ada is also highly "readable" i.e., once a program is written in Ada, other programmers can readily follow its logic. This is important because it gives software specialists the ability to quickly revise and maintain a program as a situation changes or adapt it from one application to another. For example, an Ada program designed to guide a missile system could be readily

continued on page 224

West Coast Computer Report
continued from page 13

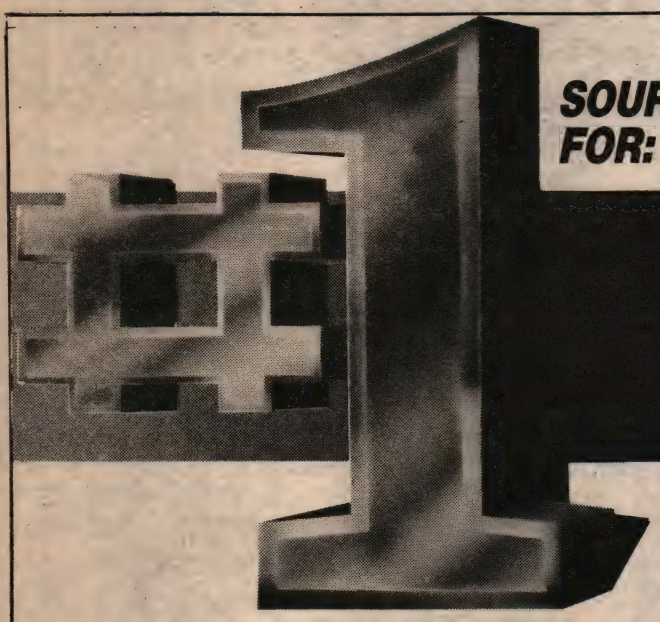
fact all the top brass from Atari visited the user group booths during the show. If you looked down at the exhibit floor from the balconies on the second floor you could see that the distribution for attendees was concentrated in the user group areas rather than in the larger exhibits.

Since this was a selling show, the vendors had great bargains mostly in PC clones, diskettes and software. The vendors reported brisk sales on Saturday and Sunday and were happy with the show.

Any show operated by Interface Group has a good selection of seminars and they outdid themselves at this one. It seems that they spared no expense to present a good program. The sessions were divided into Technical Briefings, Professional Development Seminars and Poster Sessions. They featured such speakers as Bill Godbout, George Morrow, Jim Warren, Adam Osborne, Phillippe Kahn and Jerry Pournelle. The Jerry Pournelle session was packed as usual to hear him talk about "What Next For The Micro Revolution" at least that was the announced topic. Jerry was amusing and interesting as always but had no time to answer any questions of the theme topic. Still everyone loves to hear him talk.

The real highlight of the seminars came on Sunday before the close of the show. Interface Group brought in a complete 35mm large screen projection system for Computer Animation Techniques from Lucusfilm Labs. Craig Good who is production coordinator at Pixar Computer Group, formerly part of Lucusfilm, now owned by Steve Jobs, conducted the panel. They showed examples of computer graphics used to make some of Lucusfilms' animated films. This included *The Adventures of Andre & Wally B.* a short example of computer-rendered film which demonstrates character animation, motion blur and high complexity. This seminar was the best I have ever attended on the subject and alone would have been worth a trip to the show. At the end, no one wanted to leave, we all wanted to ask more questions and see more film.

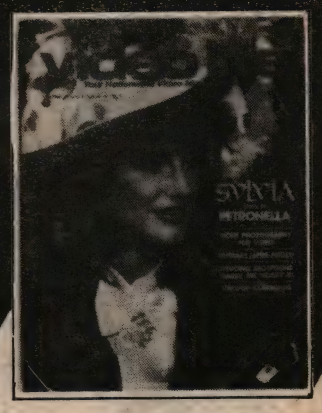
I was told that Prentice Hall had sort of let the show go to sleep, because they knew it would be sold. Interface Group had only ten days to prepare everything. The Interface Group staff performed miracles and I think they will again make this one of the most important computer shows in the year. ●



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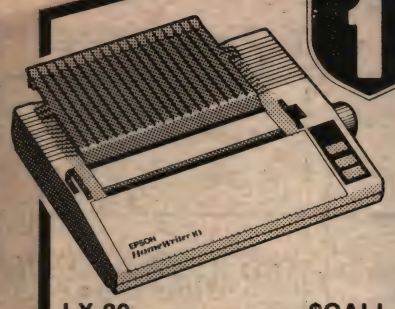
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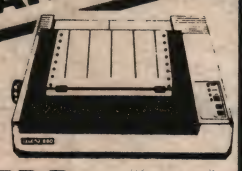
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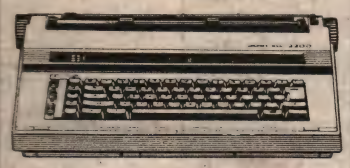
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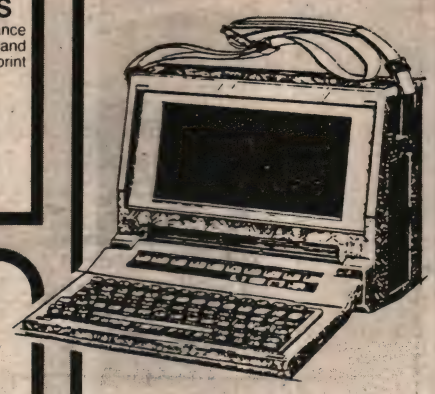
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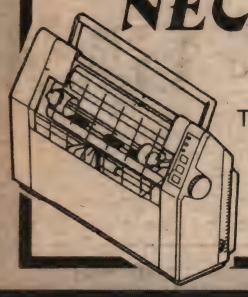
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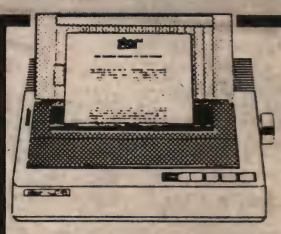
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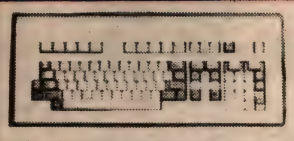
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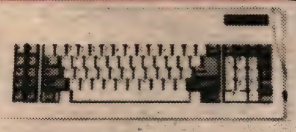
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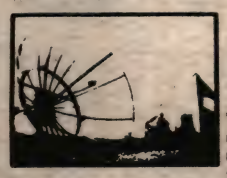
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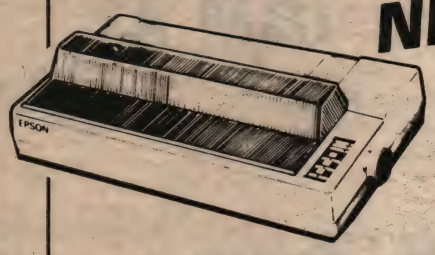
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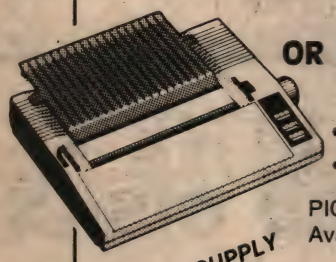
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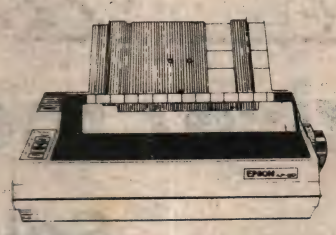
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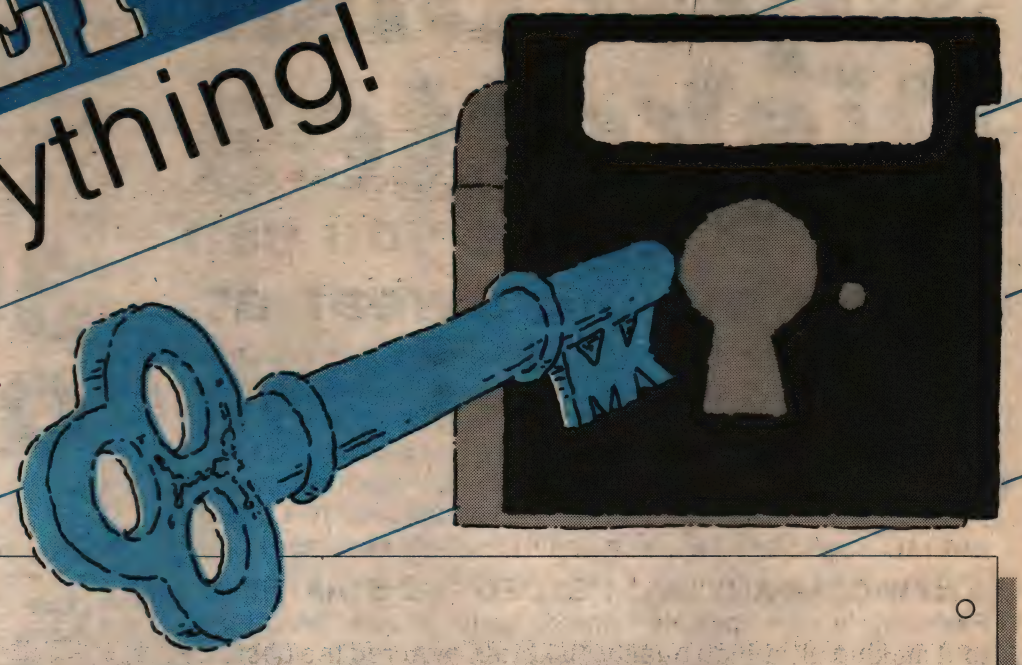
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```
A>DEBUG
-N PROGRAM.COM
-L
-D 100 129
33CB:0100  EB 0B 40 05 56 65 72 73-20 31 2E 38 31 50 B4 30   k.@.Vers 1.81P40
33CB:0110  CD 21 86 E0 3D 36 01 72-05 3D 0A 02 76 09 BA CB   M!.`=6.r.=..v.:K
33CB:0120  03 B4 09 CD 21 CD 20 58-EB 2F                     .4.M!M Xk/
```

turn this:

into this

instantly and automatically with a turn of **MASTER*KEY**!

Without MASTER*KEY, how long do you think it would take to find out this program wasn't running because you had the wrong version of DOS?

```
OFST  ASCII  OBJCODE      SRCECODE
                          ;Program:  PROGRAM.COM
0100          EB0B        H0100:  JMP    H010D
                          ;-----------------------------------------------
0102          40                  INC    AX              ;NON-BRANCHED CODE
0103   Ve     055665              ADD    AX,6556h
0106   rs     7273                JB     H017B  ;. . . . . .
0108   1      2031                AND    [BX+DI],DH
010A   .      2E                  DB     2Eh
010B   81     3831                CMP    [BX+DI],DH
                          ;-----------------------------------------------
010D   P      50          H010D:  PUSH   AX
010E    0     B430                MOV    AH,30h
0110   !      CD21                INT    21h             ;get DOS Version#
0112          86E0                XCHG   AL,AH
0114   =6     3D3601              CMP    AX,0136h
0117   r      7205                JB     H011E  ;. . . . . .
0119   =      3D0A02              CMP    AX,020Ah
011C   v      7609                JBE    H0127  ;. . . . . .
011E          BACB03      H011E:  MOV    DX,03CBh
0121          B409                MOV    AH,09h
0123   !      CD21                INT    21h             ;display string, DX
0125          CD20                INT    20h             ;terminate normally
                          ;-----------------------------------------------
0127   X      58          H0127:  POP    AX
0128   /      EB2F                JMP    H0159
                          ----------------------------------------------
```

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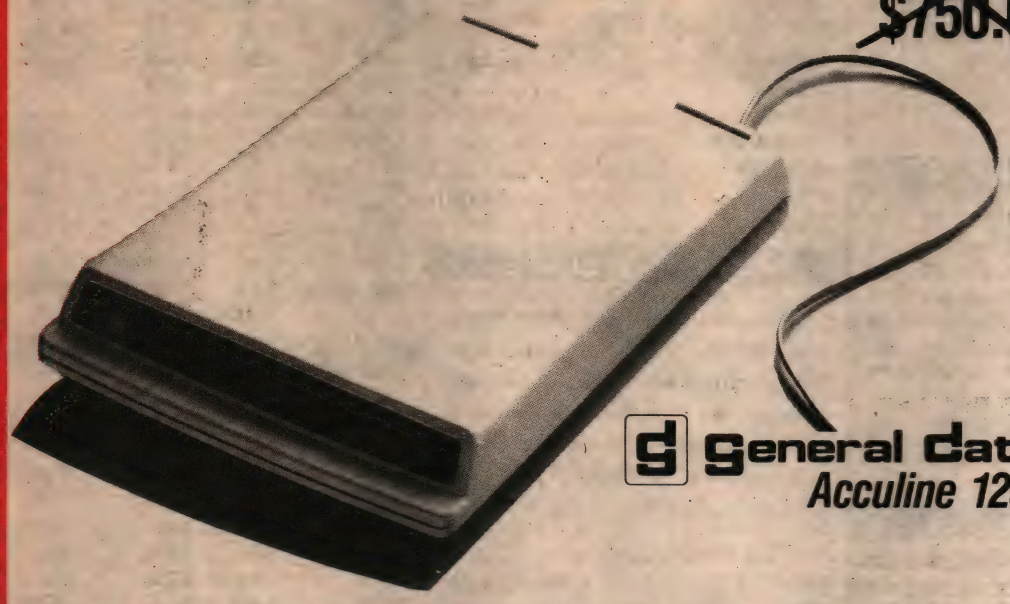
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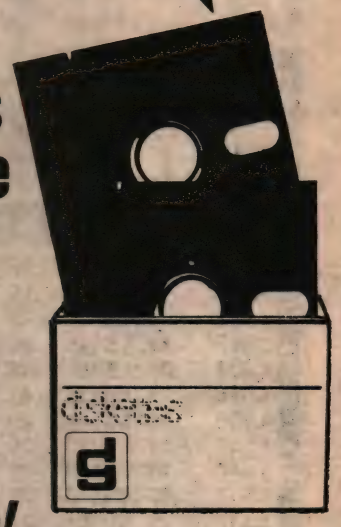
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2111-1 256X4 500 n.s.	1.00
2112A-2	2.50
2114L-3 1KX4 300 n.s.	.50
2125A-2 1KX1 70 n.s.	1.70
2142-3 1KX4 300 n.s.	1.20
2147 4KX1	1.95
TMS4044 4KX1	1.00
6116P-4-2KX8	1.25
6117	1.20
6264-15	3.45

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2108-4 8KX1	1.50
2118-4 16KX1-5Volt	.70
4027-4KX1-250 n.s.	.80
4116-16KX1-250 n.s.	.60
4116-16KX1-200 n.s.	.75
4116 16KX1-150 n.s.	1.00
4164- +5v 64K 200 n.s.	.95
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MK4516-15 16KX1-5Volt	.70
5280N-5 (2107B-4 • TMS4060) 4KX1	8/3.95
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765	3.99
1771 Single Density	3.49
1793	4.49
1795	5.00
1797	5.50
2793	7.00
2797	7.25

CONTROLLER SET

THREE CHIP SET
1797 or 1793, 2143-03, 1691
by W.D.
B.G. SPECIAL
All 3 for only $12.00

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2758 1KX8 +5V 450 n.s	2.00
2716 2KX8 450 n.s.	1.95
2716-1 2KX8 350 n.s.	2.50
2732 4KX8 450 n.s.	2.50
2732A	2.70
2732A-35	2.30
2532 4KX8 450 n.s.	2.50
2764A-200	2.75
2764-25	2.35
2764-45	1.90
27128A-200	3.20
27128-25	3.05
27128-4	2.75
27256	5.75

EPROM SPECIAL

We bought a large quantity of 2708s and 2716s from a computer manufacturer who redesigned their boards. We removed them from sockets, erased and verified them, and now we offer the savings to you. Complete satisfaction guaranteed.

Your Choice

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26LS31	.75
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75107	.30
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75451	.25
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TR1602B (COM 2017)	1.75
IM6402 +5v High speed AY5-1013 pin out	2.95
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Z80 2.5 MHZ CPU	1.25
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Z80 DART	3.50
Z80DMA	4.50
Z80PIO	1.00
Z80SIO/O	3.50
Z80A-4MHZ CPU	1.50
Z80A-CTC	1.50
Z80A DART	5.50
Z80A-DMA	5.50
Z80A-PIO	1.59
Z80A SIO/O	4.59
Z80B 6 MHZ CPU	4.75

8000/80000

Z8002	20.00	8250B	5.95
8031	5.95	8251	2.25
8035	3.00	8253-5	2.25
8039	3.00	8254	7.50
8080A	1.25	8254-2	9.50
8085	3.00	8255-5	2.25
8086	5.50	8257	2.25
8086-2	7.50	8259A	2.25
8087	120.00	8259C-5	2.75
8087-2	139.00	8275	14.95
8088	5.50	8279-5	3.25
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D8203-1	29.95	8288	4.50
8212	1.25	Z8603	4.95
8214	2.00	8741	9.50
8216	1.25	8748	9.50
8228	3.25	8749	9.50
8237-5	5.00	80286	119.95
INS 8248	4.95	80287	199.00
8243	2.00		

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6502	2.55	6820	2.75
6522	3.50	6821	1.50
6532	5.00	6840	6.00
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6551	5.00	6845S	4.50
6800	1.75	6850	1.75
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6803	3.00	6860	3.95
6805	2.95	68A09EP	3.99
6809EP	3.99	68A21	3.00
6809P	3.50	68B40	8.50
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32.768 Khz	.65	8.000	1.49
262.144	.75	9.000	1.49
300.000	.75	9.90000	1.25
1.5432 Mhz	.75	10.69425	2.50
1.8432	1.59	10.8864	1.49
2.000000	2.49	10.920	1.49
2.560	1.49	11.088	1.59
3.000	1.15	12.000	2.00
3.120	1.20	13.440	1.00
3.2	1.49	14.31818	1.00
3.4560	1.49	15.2	1.10
3.579545	.60	16.00000	1.50
3.6864	1.10	16.5888	1.49
4.000	1.75	17.430	2.49
4.194304	1.50	18.000	1.49
4.433618	.75	18.2259	1.00
4444.000	1.25	18.4320	1.49
4.9152	2.49	18.432OSC	2.95
4.916	1.25	20.000	1.29
5.000000	1.50	21.87108	1.00
5.0688	1.70	22.092	1.00
5.616	1.59	32.000	2.49
6.000	1.00	40.000	2.00
6.176	1.49	87.3333	1.00
7.164112	1.00	91.000	1.00
7.3728	1.49	104.8	1.00

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5027	6.95
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$49.95
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POWER SUPPLY (135W)
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LM311	.50	LM1488	.45
LM317T	.65	LM1489	.45
LM319	.75	MC1558F	1.49
LM324	2/.99	LM1889	1.29
LM339	.40	ULN2003	.59
LM358	.25	ULN2068	.59
LM380	.75	ULN2074	.75
LM386	.59	LM2917	.50
LM393	.40	CA3146	.75
NE555	.22	3341	.75
NE556	.45	MC3403	2/.99
NE558	.75	MC3486	.75
NE564	1.29	MC4024P	2.29
NE567	.49	UA4136	.59
NE570	2.00	4558	.40
NE592	.69	MC4741	2/.99
LM723	.35	MM5395	1.25
LM733	.49	DS8835	1.50
LM747	.49	DS8837	1.40
MC1350	.89		

PROMS

82S123	1.99
82S126	1.99
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LM317T	.65
723	.35
78M05T - 500 MA	.22
7805T	.35
7905K	.75
7905T	.50
7808T	.50
7812K	1.00
7812T	.40
7912K	.50
7912T	.50
7815T	.50
7915T	.50
7824T	.50
7924T	.50
78GU1C (T)	.50

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SG3524 Features:

- Complete PWM power control circuitry
- Single ended or push-pull outputs
- Line and load regulation of 0.2%
- 1% maximum temperature variation
- Total supply current less than 10mA
- Operation beyond 100kHz
- 16 Pin D.I.L.

1.59

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Low Profile SOLDER TAIL

6 Pin	14/1.00
8 Pin	13/1.00
14 Pin	10/1.00
16 Pin	8/1.00
18 Pin	8/1.00
20 Pin	7/1.00
22 Pin	7/1.00
24 Pin	6/1.00
28 Pin	6/1.00
40 Pin	5/1.00

BUY $10
GET $1.00 - FREE CHOICE

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For Dynamic Memories. Pick any delay from 10 to 100 n.s. with this dual in line 14 pin device from Pulse Engineering. 10 Taps

PE9825 - 1.49 each.

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TL084	.90
LF351	.39
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TL494	2.50
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AY38910 w/Manual	7.00
TMS99532 MODEM	9.95
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2672	3.95
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AM2901	1.55
AM2907	1.75
AM2909	1.65
AM2911	1.75
AM31LO1	1.75
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4040	.49
4511	.49
4538	.70
ICM7218C	1.25
ICM7218D	1.25
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8038	3.75
9216	2.00
9401	3.50
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DAC08CN	1.79
6100 - CMOS 12 Bit CPU	3.95
NSC 800	3.95
9403 FIFO	2.25

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4 Position	.40
5 Position	.50
6 Position	.70
7 Position	.50
8 Position	.50
10 Position	.65
12 Position	.75

400/800 CASSETTES

REQUIRES ATARI RECORDER

We bought 5 skids of these cassettes. Titles include: *Touch Typing, Invitation to Programming I & II, Hangman, Introduction to Sound, Blackjack, Juggles House, Juggles Rainbow, Introduction to Graphics, States and Capitals, European Countries and Capitals, Scram and Writing Programs Two.* These are a very high quality recording tape and may be recorded over for excellent reproduction. Most come in cassette holders. Sorry, no choice on titles. Super good assortment (some duplications when necessary). Most C-60. May be last chance to obtain these.

12/$15.00 or 24/$25.00

PC-XT Compatible Dot Matrix Printers by Olivetti Model # PR1450

BRAND NEW IN ORIGINAL FACTORY BOXES. HIGH SPEED: 100 CPS - INCLUDES LONG LIFE PACK - CART RIBBON CARTRIDGE - FRICTION OR PIN FEED - CENTRONICS PARALLEL INPUT, IBM P.C., X.T. COMPATIBLE. HEAVY DUTY CONSTRUCTION FOR CONTINUOUS SERVICE. MULTI-FUNCTIONAL CHARACTER FONT. DIP SWITCH OR SOFTWARE SELECTABLE PRINT FORMAT FOR EITHER 80 COLUMN STANDARD, 132 COLUMN COMPRESSED, OR DOUBLE SIZE CHARACTERS. FORM LENGTH ALSO PROGRAMMABLE. ORIGINALLY COST BIG COMPUTER COMPANY SERVERAL TIMES OUR SALES PRICE.

NEW IN BOX WITH DATA
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PANASONIC

Green Screen - Video Monitors

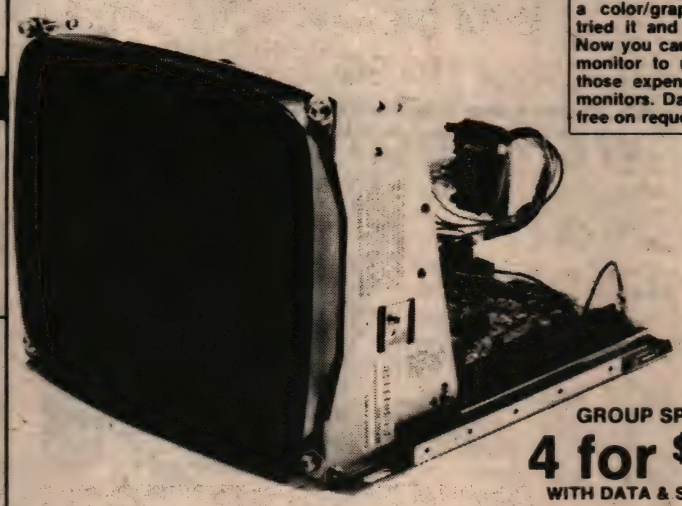
25 MHZ. TYPICAL BANDWIDTH!!!

Brand New In The Box! 9-Inch Screen

#K-904B1 (Chassis #Y08A) Open Frame Style

$29.95 EA.

IBM PC COMPATIBLE!
We have just received data on how to connect these monitors to a PC/XT through a color/graphics card. We tried it and it works great! Now you can buy a low cost monitor to use in place of those expensive RGB color monitors. Data and hook-up free on request.



GROUP SPECIAL:
4 for $99.00
WITH DATA & SCHEMATIC

(USA SHIPPING: $3. PER UNIT. CANADA: $7. PER UNIT)

COMPUTER MANUFACTURER'S EXCESS. STILL IN ORIGINAL PANASONIC BOXES. THE CRT TUBE ALONE WOULD COST MORE THAN OUR PRICE FOR THE COMPLETE UNIT. FOR SPLIT VIDEO (TTL INPUTS) OPERATION, NOT COMPOSITE VIDEO. OPERATES FROM 12VDC AT 1 AMP. VERTICAL INPUT IS 49 TO 61 HZ. HORIZONTAL INPUT: 15,750 HZ ± 500 HZ. RESOLUTION IS 800 LINES AT CENTER 650 LINES AT CORNERS.

ATARI MODEM BOARD

Apparently manufactured for Atari by Raycal-Vadic. P.C Board #81219-903 Rev. D. These are complete factory finished modem boards with all parts except the 8048 (8748) C.P.U. chip, for which there is a socket. Includes the popular T.I. TMS99532 modem chip which is socketed. This T.I. chip alone lists for as much as $29.95 at some of our competitors. These are factory new boards with all connectors, switches, relay, etc., but are sold as is —no warranty or data. Super limited quantity.

DIRECT CONNECT

$7.95 3/$20.00
Add $1.50 each for shipping

VERY LIMITED QTY.
8048 For Above Board
$7.50

TERMS (Unless specified elsewhere) Add $1.50 postage, we pay balance. Orders over $50.00 add 85c for insurance. No C.O.D. Texas Res. add 6-1/8 ...ay Money ...exico Countries ...k Guarantee on all items. All items subject to prior sale. Prices subject to change without notice. Foreign order - US funds only. We cannot ship ...ther than Canada, add $3.50 shipping and handling.

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"TALKERS"

SPEECH SYNTHESIS TECHNOLOGY AT SURPLUS PRICES!

We were recently fortunate to purchase a small lot of surplus computer boards that incorporate the very latest in high quality human speech synthesis.

This two board set was the heart of a blood analysis system designed for use by blind diabetics. This unique device was conceived by one of the world's leaders in computer blood systems. Apparently no expense was spared in either the research, design, or fabrication of this computer.

The board sets we are offering are NOT complete blood analysis systems and are sold only for the speech synthesis circuitry they contain. A powerful motorola 68705 U3L single chip processor controlled the blood analysis unit. This processor also interfaces to the General Instruments two chip speech set which includes a SPO256-AL2 (28 pins) and a SPROOO (40 pins).

The GI SPO256 contains 59 addressable allophones and 5 pauses which may be strung together to produce any English word. The SPROOO allows expansion to the external EPROM (27128) for storage of the desired vocabulary. The SPO256 also has a vocal tract model, 16K ROM, ALU, handshake control, pulse width modulator, 12 holding registers, and 5 interpolation registers all in one 28 pin package! This high density chip design allows for a complete voice system that requires only a few parts to be complete.

By adding only one resistor, the units can be put into a "Test" mode to demonstrate the internal vocabulary. This board set has been selling like crazy at surplus stores in both Dallas and Houston. We have, however, set aside a limited number of these boards for sale to our special mail order customers. One resourceful customer in Houston even had one of these "Talkers" connected to his personal computer doing random speech!

These devices were powered by a regulated 9VDC 1 Amp power supply. We have luckily acquired a FEW of the supplies, and are selling them for $6.95 each when purchased WITH the Talkers. The DC supply is a totally self contained affair that is rated for only 10 mv ripple at the output. DC supply when purchased separately is $12.95.

We are also offering the GI set separately (new, unused parts) for $9.95. Remember: this is for BOTH chips. Radio Shack sells the SPO256 alone for $12.95!! Our stock on the new chip pairs is limited, please order early to avoid being left out. Sure. the completed Talker units are a better deal, but you still might want to purchase an extra chip set for a spare.

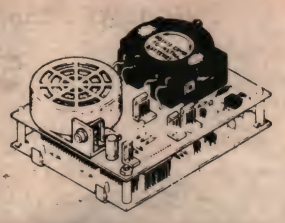
For the real hardware hackers we have a few of the blank PC board sets to the Talkers for $4 (both boards).

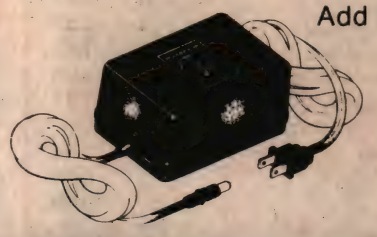
We include full schematics of the Talkers, GI speech chip set data, and "Test" instructions, with every shipment. Note: issue #29 of Analog Computing (P.O. Box 615 Holmes, PA 19043) has a very detailed article on using the SPO256 with a personal computer.

Due to the limited number of Talkers in stock, we advise early ordering.

Radio Shack tm of Tandy Corp.

3.12 Crystal **$1.20**
Chip Set **$9.95**
P.C. Board Set **$4.00**
Power Supply Alone **$12.95**





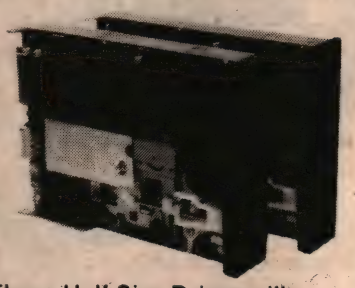
Add $3 Shipping in USA, Canada: add $6
(For Talker and supply)

Talker **$14.95**
Power Supply **$6.95**
(When Ordered With Talker)

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5-1/4" HALF SIZE DRIVES!

For IBM PC, TI PC, XEROX 820



- 40 Track per side 48 TPI
- Double-sided, double density
- Same as SA455
- Latest head & drive technology
- Fast access time

*Two of These Half Size Drives will Fit in the Same Space as 1 Full Size Drive!

$69.95 2/$129.95

ADD $3.00 UPS PER DRIVE

- 80 Track per side 96 TPI
- Double-sided, quad density
- Same as SA465
- Latest head & drive technology
- Fast access time

*Two of These Half Size Drives will Fit in the Same Space as 1 Full Size Drive!

$99.95

ADD $3.00 UPS PER DRIVE

DRIVE DEAL

5¼" FULL SIZE DRIVES

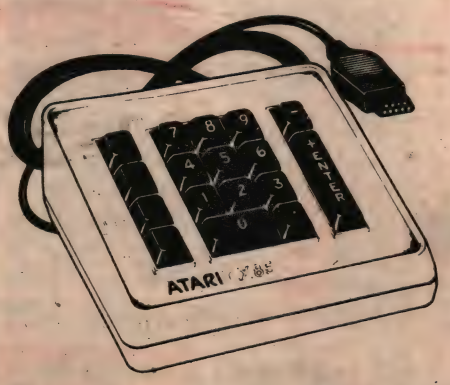
$39.95 A GREAT BUY!

2/$69.95

- 80 Track Per Side 96 TPI
- Double Sided Quad Density
- Fast Access Time



Add $3.00 UPS Per Drive



ATARI HEX KEYBOARD

$7.95

3 for $20.00

Add $1.00 per unit for postage.

TERMS:
Guarantee on 's specified elsewhere) Add $1.50 postage, we pay balance. Orders over $50.00 add 85¢ for insurance. No C.O.D. Texas Res. add 6-1/8% Tax. 90 Day Money Back Canada, add $3.50 ...s. All items subject to prior sale. Prices subject to change without notice. Foreign order - US funds only. We cannot ship to Mexico. Countries other than ...ng and handling

Aceson Computer Equipment



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2 Drives, 640K
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With Clock,
10 MB Hard Disk $2099

Call for Quotes on Other Compaq Systems.

IBM AT

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QUADBOARD BY QUADRAM

Parallel & Serial Ports, Clock/ Calendar, Game Port, Software & 64K *All for Just*

$179

AST 6 PACK

Parallel & Serial Ports, Clock/ Calendar, Software and 64K

All for Just **$215**

Game Port for Above $39

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MEMORY — 1 Year Warranty

64K 4164-150ns (set/9) . . . . $ 9
256K 41256-150ns (set/9) 28
128K 4128-150ns (set/9) 39
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Math co-processor for 6-8 mhz 8087-2 149
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One year warranty (parts & labor)

Features:
- 8088 CPU (4.7 Mhz)
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- 8 Expansion slots
- Par/Serial port
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- 135 watts pwr sup
- 12 inches ttl amber or Hi-res color
- Dos 3.1 and GW. Basic
- Run all IBM software

System With

1 360K Floppy Drive, 256K Ram, Keyboard, Monochrome Video Card, 12" Monitor, Par Port

and

Panasonic KX-P1090
Impact Dot Matrix Printer, 80 CPS, Friction and Tractor With Cable

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1 Year Warranty

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Features:
- 2 each 360K Teac drives
- 640K RAM
- 8 Slot mother board
- Par/Serial port
- Ram disk
- Spooler
- Hercules compatible video card
- Samsung 13" amber monitor

$1075.00

SYSTEM XTC-2

Features:
- Same as System XTC-1 but has
  - Hi-Res Hercules compatible color CD
  - Samsung Hi-Res RGB Monitor

$1299.00

SYSTEM XTC-3

Features:
- Same as System XTC-1 but has
  - 20MG Hard Disk

$1599

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VIDEO CARDS—1 Year Warranty

Hercules Type color graphics & composite with par port . $100
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(can RGB & mono simultaneously)
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2 Drives, 256K, Monochrome Monitor $1695
2 Drives, 256K, Color Monitor $1895
2 Drives, 256K, 10 MB Hard Disk, Monochrome Monitor $2149

IBM XT

1 Drive, 256K, 10 MB Hard Disk, Monochrome Monitor $2549
1 Drive, 256K, 10 MB Hard Disk, Color Monitor $2489
1 Drive, 256K, 20 MB Hard Disk, Monochrome Monitor $2499

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FX-185 (15" / 160 CPS) . . . Call
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192P (10" / 160 CPS) 349
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Panasonic:
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Sprint 11/90 + LQ 90 CPS 132 COL . . . . . Call
Interface Module . . . . . $ 95

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P-321 *Free printer cables with every Toshiba printer.* 499
1340 375

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PX4 399

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722 500

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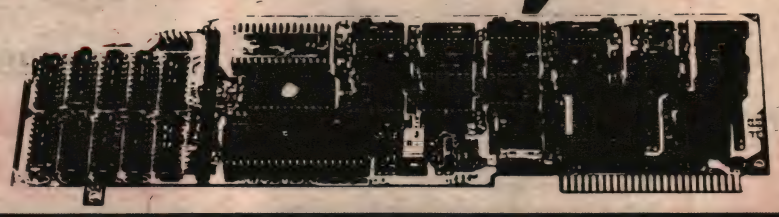
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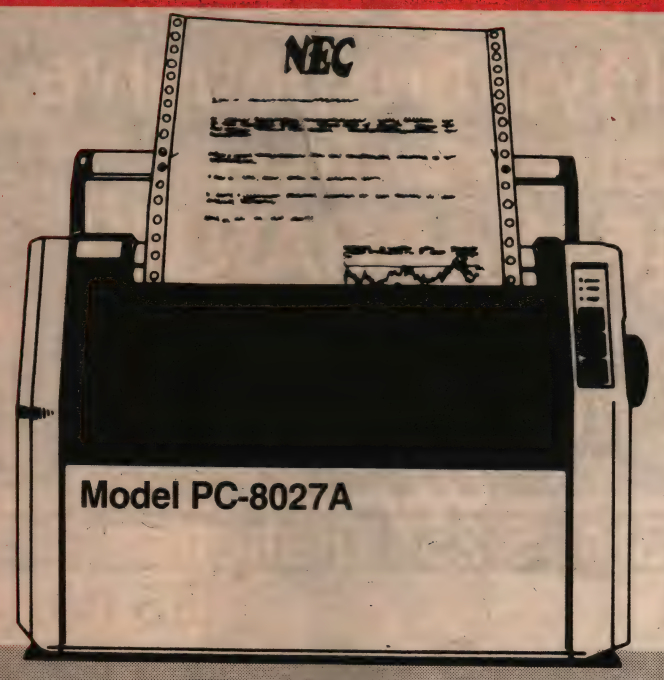
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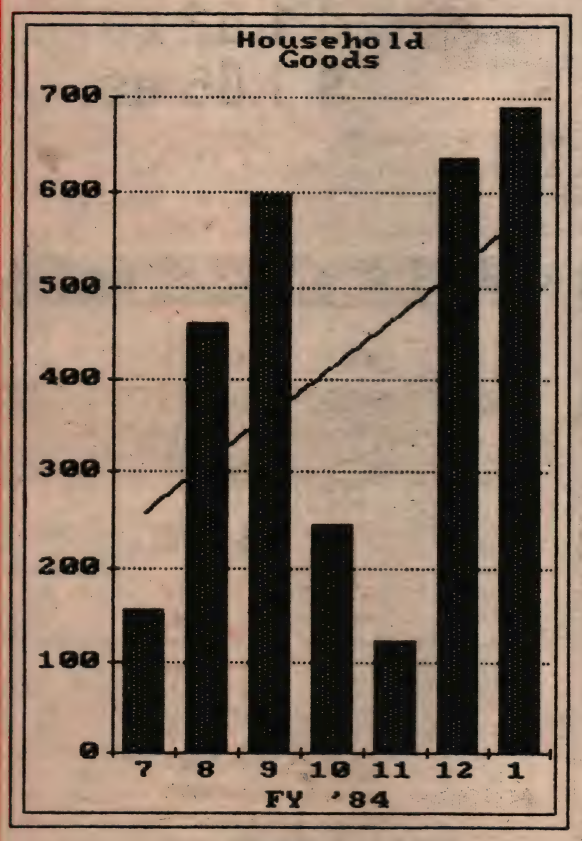
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Just buy Super Star® diskettes.

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We ship almost a million Super Star® diskettes a month and get very few of them back.

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Nearly a million Super Star® diskettes a month are being sold to some of the largest and most recognizable names in the nation. They love 'em, because they save money...and they are dependable.

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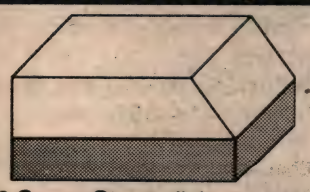
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The 5.25" unit holds 50 diskettes and the 3.50" unit holds 40 diskettes.

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5.25"DSDD-HD(P/N3403)	2.07	2.04
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5.25"DSDD-96TPI(P/N1011)	1.98	1.93
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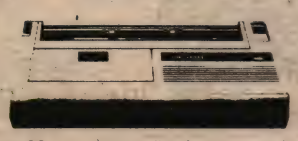
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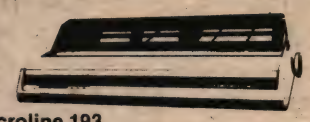
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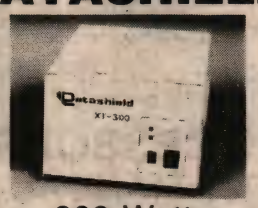
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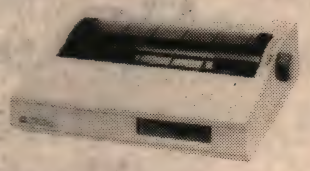
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They are made by top USA makers, and should not be confused with low-end, seconds, or cut-rate disks. Since we are one of the largest disk buyers in the world, the manufacturers give us their best prices! In our agreement with the manufacturers, we can't reveal their names, but when you receive them you'll recognize these as among the highest-quality nationally-advertised disks!

PRICE vs. QUALITY

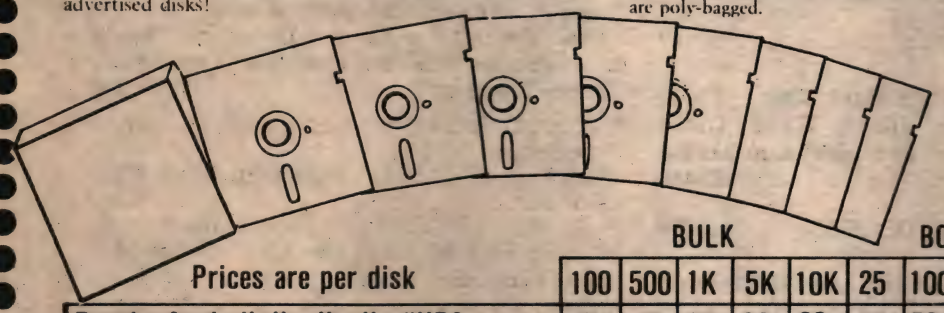
We've tried almost every brand of disk in the world, but we haven't found a more reliable, higher quality disk than the Unitech Disk. A brand-name disk is not necessarily better, it's just branded! Cheaper disks may seem like a bargain, but only until you try to use them. Unitech is so sure that our disks are 100% perfect that we offer our famous UNCONDITIONAL 30 MONEY-BACK SATISFACTION GUARANTEE, AND OUR LIFETIME REPLACEMENT WARRANTY!

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Unitech has extremely high standards of quality. People that buy Unitech disks are so pleased with our diskettes that they come back again and again! Word-of-mouth can make or break a company, and through our committment to excellence in products, service, and price, Unitech has benefited from an unprecedented number of referrals by satisfied customers. Our customer-service staff enjoys selling Unitech's high quality products at a pro-consumer company. We have received many letters complimenting our blue-ribbon customer service staff, and we're proud of them!

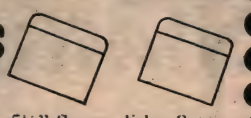
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Prices are per disk	BULK 100	500	1K	5K	10K	BOXED 25	100	500	1K	5K
For the Apple II, II+, IIe, IIc #UDA	45¢	42¢	39¢	36¢	33¢	58¢	53¢	50¢	47¢	44¢
SS/DD for single side computers #UD1	50¢	47¢	44¢	41¢	38¢	63¢	58¢	55¢	52¢	49¢
DS/DD for IBM-PC and compatibles #UD2	55¢	52¢	49¢	46¢	43¢	68¢	63¢	60¢	57¢	54¢
DS/Quad Density (96tpi) #UD4	1.09	1.04	99¢	92¢	89¢	1.19	1.11	1.06	1.02	99¢
DS/Hi-Density for IBM-AT #UAT	2.15	2.12	2.10	2.08	1.99	2.40	2.25	2.22	2.20	2.18
3½", single side for Mac #UD3	1.86	1.83	1.80	1.77	1.74	1.89	1.86	1.83	1.80	1.77
3½", double side for Mac & Amiga #UD6	2.65	2.55	2.45	2.40	2.30	2.80	2.70	2.55	2.45	2.40
5¼" SLEEVES, 24# white wove #SLV	5¢	4.5¢	4¢	3.8¢	3.3¢	SPECIFY SUFFIX "N"-"J"-"D" WHEN ORDERING DISKS!				
5¼" SLEEVES, white Tyvek #TYV	7¢	6¢	5.5¢	5.2¢	5¢					

TYVEK SLEEVES 100 for $7



White lint-proof plain sleeves for 5¼" floppy disks. See chart for quantity pricing.

UNIFILE-10 99¢



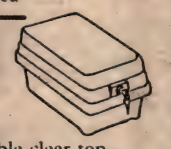
Library Storage Cases, holds ten diskettes! Protects archival copies, master disks from dust and debris. Snap together clear plastic design, 6x6x1.25" #FILE10 10/95¢ ea

UNIFILE-70 $8.88



Holds over 70 5¼" diskettes! Complete with index dividers and flip-top lid. Smoke colored tough plastic construction. #FILE70 case of 24/$7.99 ea

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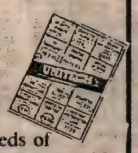
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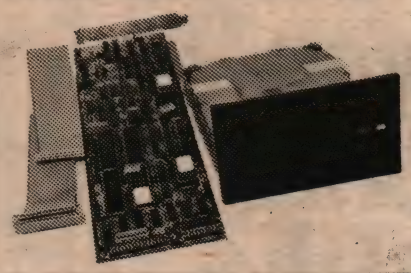


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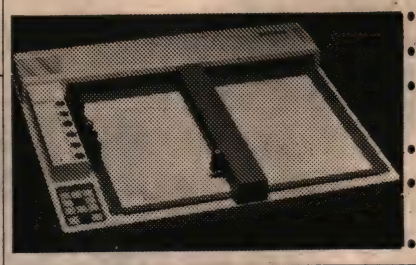
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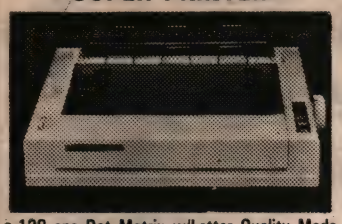
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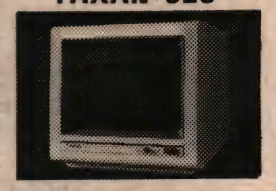
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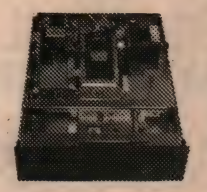
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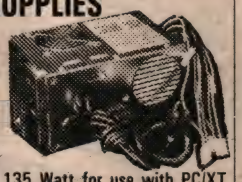
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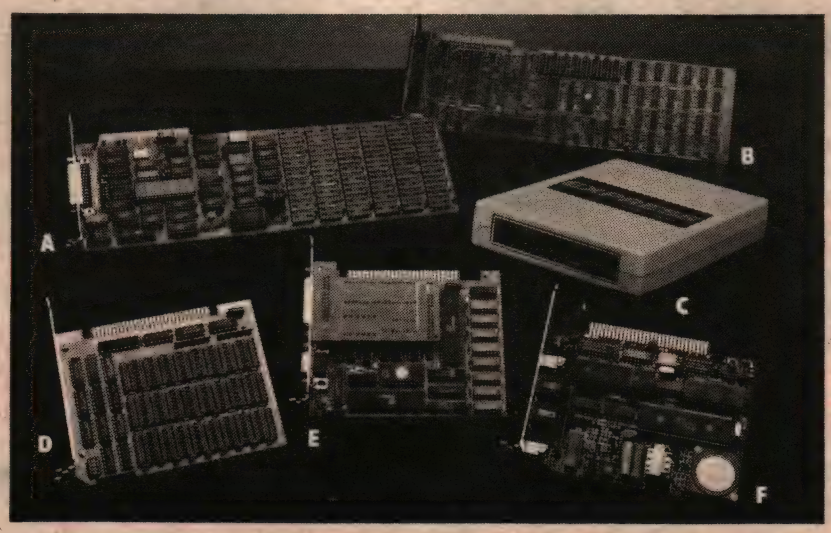
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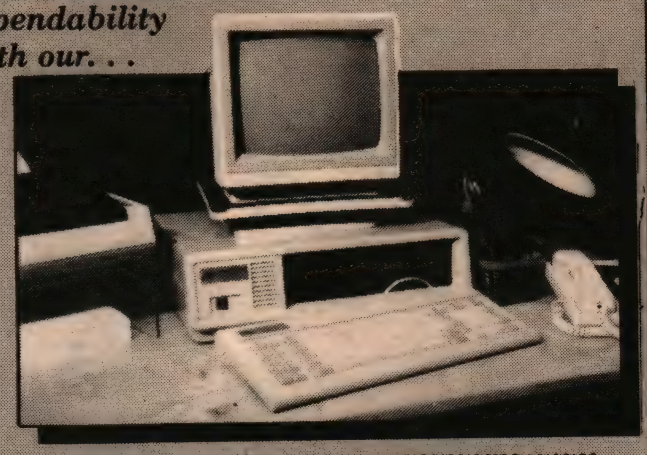
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Atron PC Probe Professional Hardware Debugging Tool

by Andrew M. Fried

My last article concerning software debugging programs centered on Periscope, the program written by Brett Salter and sold by Data Base Decisions. This month we'll turn our attention to the PC Probe, the hardware debugging tool produced by Atron.

There are generally three classifications of debuggers. The first, represented by the debugger which accompanies DOS (DEBUG) is a software only debugger and does not offer symbolic debugging. Its usefulness is limited to the "trace and look at the registers" procedures.

The second classification is the symbolic debugger characterized by Microsoft's debugger SYMDEB. Basically, SYMDEB is an extension of DEBUG which permits the use of symbols (or labels) for addresses and values.

Finally, the third type of debugger is the hardware assisted debugger like Atron's PC Probe. These systems are able to perform very advanced system monitoring in a real time environment. This is accomplished by connecting a board in parallel with the main central processing unit (CPU). A close cousin to these products are logic analyzers.

Billed in the trade magazines as the "Bugbuster," Atron's PC Probes main advantage over software debuggers lies in its ability to provide real time event trapping based on the reading and/or writing to given memory addresses or ranges of memory.

As one might imagine, tools as sophisticated as these are not cheap; for the PC family of computers, the cost of the Probe and software can easily exceed the cost of the computer itself. Due to cost alone, professional debuggers such as this are not generally marketed towards the computer user or part time programmer.

One of the things I discovered in my evaluation of the PC Probe is that hardware debuggers compliment rather than replace the less powerful debuggers like Periscope and SYMDEB. The reason for this is that hardware debuggers generally are quite limited in their capability when working without the original source code.

All symbolic debuggers obtain their symbols from the linker's map file. The hardware debuggers use these symbols for a majority of their functions whereas software debuggers like Periscope offer greater breakpoint capability without the need for the map.

If you find yourself disassembling programs and making changes and patches to them, you would be happier with Periscope. If, on the other hand, you're a software house that prides itself on creating tight, bug free assembly code, you can rest assured that the cost of the hardware debugger is quickly recovered by dramatically reducing the time required to debug programs.

Why a Hardware Debugger?

The key words to remember when evaluating professional hardware debuggers such as this are "real time." Software debuggers, being programs that run outside of the program being debugged may slow down program execution down by a factor of 100. When working with large programs or programs that make numerous interrupt calls, the time factors become significant.

Hardware debuggers feature four important characteristics that assembly language and C programmers find extremely useful. The first being real time tracing of program execution. This permits the debugger to monitor certain preset conditions and allow them to perform a breakout if the conditions are met. All of this is done, however, during real time program execution.

Secondly, hardware debuggers generally have provisions to protect critical code which insulates the debugger against a wild program from overwriting its code. Bugs of this nature are exceedingly difficult to find with software as the program going awry often overwrites your software debugger in memory. The bug prevents you from using the debugger while the debugger is the only way you have to effectively locate the bug! A Catch-22 situation.

Third, hardware debuggers (by utilizing the non-maskable interrupt) offer breakout switches which allow you to immediately stop program execution and return to the debugger command level. This is particularly important when debugging interrupt driven software.

One example where the breakout switch is utilized effectively for advanced program debugging occurs when you program an endless loop jump at a given location in the code. When these loops cause the computer to "hang," you can use the breakout switch to enter the interactive debugger mode. This gives you the opportunity to examine all of the registers, the stack, etc. Once done, you merely continue program execution by modifying the instruction pointer and continue program execution.

The breakout switch is also important when your misbehaving code causes your computer to "hang." When this occurs, you can enter the debugger by pressing the breakout switch and either reboot the system or manually modify the registers to continue program tracing.

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New IBM PC Convertible

by Rich Fields

A month after the big IRS plum was awarded to Zenith, the wraps were finally taken off the IBM portable computer and it was introduced to the world as the IBM PC Convertible. This newest member of the PC family is also the smallest IBM computer in the line. In spite of its size, the PC Convertible is a full-function PCDOS computer with a basic price under $2,000. The PC Convertible features a detachable LCD display with an 80-character by 25-line screen. This has a special character font designed for improved readability on the liquid crystal display. The display uses a 16KB RAM buffer and a 8KB RAM for the LCD character font memory. The position of the display is adjustable over a wide range. When removed, the computer can use either a 9-inch monochrome monitor with 80 x 25 or 40 x 25 text mode. It also supports 640 x 200 and 320 x 200 graphics mode. The PC Convertible can also use the IBM PC Convertible color display which is a 13-inch CRT with both an 80 x 25 and a 40 x 25 text mode and a 320 x 200 color graphics mode.



IBM PC Convertible

The keyboard has 78 keys. The alpha key layout is like the IBM PC/XT but the function keys are placed on the top row and the cursor control keys are clustered at the lower right. There is no numeric keypad. The inclined keys are full-travel and have an excellent feel while typing. This is probably the best portable keyboard I have come across.

The PC Convertible uses a 80C88 CPU, the low power CMOS version of the 8088 microprocessor. The 64K CMOS ROM contains power-on self test, the BIOS and BASIC interpreter. The memory consists of two 128K CMOS RAM cards. Additional memory may be added to a maximum of 512KB.

The mass data storage consists of two built in 3 1/2" "hard shell" flop-

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Guru

Integrated Software That Leads While Others Follow

by Lon Andrews

GURU: "A leader with devoted followers or a spiritual adviser" (Webster's New World Dictionary). To me Guru always meant a person with all the answers. Either definition seems to fit MDBS' package GURU. Given the proper input it will have all the answers, it does advise and it is going to have a raft of devoted followers before long!

Micro Data Base Systems, Inc. (MDBS) hails GURU as "Artificial Intelligence That Means Business." No stranger to data base software MDBS developed MDBS III data base and Knowledge Man. These packages are available in at least seven languages besides English, making them well used around the world as, it appears, will GURU.

Last month I stepped out on a verbal limb and praised GURU with some reservations due to having the package for a short period of time. I was right to praise it but I have changed my views some after using the program. Few individuals will want to use GURU at home due to the complexity and price. In a business situation where it will be used constantly GURU will shine like a torch on a dark night, leading the way for others to follow.

What makes this integrated package different from all the others is the incorporation of Artificial Intelligence (AI) technology to give it capabilities above and beyond what you might expect. Even without the AI, GURU is a tremendous tool for the business user. The goal of AI is to give the computer the ability to solve problems as the human mind solves them and the ability to communicate with the user without using a complicated programming language. GURU manages both.

Two years in design and production, GURU is designed as a tool for business problem solving. For many businesses GURU might well be the only software used if it is used properly. As with most integrated packages this one has the capabilities of a spreadsheet, word processor and a relational data base. Add to that color graphics, statistical analysis, remote communications, forms generation and management, spur-of-the-moment inquiries, structured programming language, mouse capability, data security text processing, spelling, expert systems and more. Different elements the package can be intermingled in a single operation without exiting one element and entering another. These combinations along with the reasoning ability of the Artificial Intelligence to use the expert systems give this package explosive capabilities.

Remember the movie 2001 and HAL? A computer that you could talk to and that would answer with an amazing logic? Computers have been headed in that direction for a long time... Talk to them and they answer. Forget the necessity of learning a language to instruct the machine what you want done. GURU is one step closer to that plateau. You can instruct GURU in plain language once it is set up for your operations.

MDBS calls the type of integration in GURU "Synergy" which simply means that the total benefit of the components is greater than the sum of their individual effects and that no component interferes with the use of any other component. This in effect eliminates swiching back and forth between elements within the integrated package.

Being a product of data bases like the Profile series and AIDS I needed awhile to get into the swing of using a product like this. It is a lot like a good book. The more you read the harder it is to put it down and to go on to something else. GURU will take time to get used to. If you have been using Knowledge Man the task will be a lot easier. It definitely is not something that you will buy today and put into use tomorrow in your business; however, once it is set up I don't think you will "put it down."

GURU comes with five disks, four instruction manuals, and a demo manual. This system requires at least 512K of RAM (you are better off with 640K) and a hard disk with at least 2 Meg of usable space. The four manuals are extremely well written. Don't let their size throw you. One is the Menu User's Guide, another the Command User's Guide and two are Reference Manuals.

Disk #1 contains an INSTALL routine that will put the program on your hard disk in a subdirectory, "/GURU." At the start of the routine you will have to answer some questions about your hardware and set up. Once this is accomplished, put in the disks as requested and relax until it is through. The INSTALL routine is well documented in an Appendix in the Command User's Guide and includes any error messages you might encounter. I found no problems with installing GURU on my Tandy Model 1000.

Start with the DEMO manual and try the program. The DEMO will introduce you to: consulting expert systems and let you experience writing "rules" using the rule set editor. You will use plain English to ask GURU questions concerning the data stored in the data base; the capabilities of the information management part of GURU and to sample rule sets and programs included as text files in the demonstration. GURU is written in C

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New IBM PC Convertible
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pies each storing 720KB. The disk drives are located in the front of the computer for easy access. Not everyone is happy about IBM's choice of the 3 1/2" drives. It is said that one factor for the selection of the Zenith Z-171 was its use of 5 1/4" drives. Business users who are expected to be the principal users of the PC Convertible would much prefer to be able to use the same disks in a portable as they use in their office machine. At the West Coast Computer Faire where I saw and used the PC Convertible, IBM reps said, "This is supposed to be a supplementary computer, not a substitute for a desktop machine. We are providing a 3 1/2" drive to be used with your desktop PC/XT or AT. There is no 5 1/4"drive to be attached to the PC Convertible." As an indication of IBM's intentions is the fact that they introduced a 3 1/2" internal drive intended to be mounted inside your XT. There is a different 3 1/2" drive to make the PC Convertible and the AT compatible. This 3 1/2" ploy forces users to purchase software versions on the smaller drives. True, most of the software publishers are running to release 3 1/2" versions of their software. To the user it only means extra expense and a lot of the corporate users may follow the US Government to Zenith for their portable requirements.

Being a true portable, the PC Convertible has a built-in battery pack giving 6 to 10 hours of portable use depending upon diskette drive use and printer use. Both an optional charger and an automobile adapter are available.

For communications, an optional internal modem board is available as well as an optional serial RS-232C and parallel interface board.

There is a PC Convertible printer which attaches to the rear of the computer. It is a microprocessor-based 40 characters-per-second, dot matrix unit capable of low power operation. It employs a 24-element print head which produces standard 96-character ASCII type with upper/lower case characters. In addition an all-points-addressable print mode for graphics is provided. The printer uses either multi-use copier paper, thermal paper or thermal transfer paper. The ribbon will last for 26,000 characters.

The PC Convertible is designed to sell for $1995. The printer is $295 and the displays are $180 for monochrome and $400 for color. To use the external monitors you need the CRT display adapter for another $325. The 128KB memory cards are $195 and the modem is $450. The Serial/Parallel adapter is $195. The battery charger and auto adapter are $25 each. From these prices you can see that a full blown PC Convertible system is not cheap. This is not all since you still need to purchase a 3 1/2" disk drive to adapt to your PC/XT desktop computer. You will also need the special version of Lotus, dBase, or whatever you use in your office that you want to use on your portable. GOTCHA!

IBM says they have only been able to produce this system for $1995 because of their use of the latest technology in surface mounting circuit techniques and robotic factories. This means that once the huge start-up costs have been recovered, the unit costs of producing these products drops to an amazing low. ●

IBM PC Convertible

Standard Configuration $1,995

Microprocessor	80C88
Storage	Dual 720K-byte 3½-in. floppy disk drives
Memory	256K bytes, expandable to 512K bytes
Weight	13 lbs.
Keyboard	78 keys
Power	Battery pack, AC adapter
Display	80-col. by 25-line LCD

Option Costs

Dot Matrix printer	$295
Monochrome composite video display	$180
Red-green-blue display	$400
CRT display adapter	$325
Serial/parallel adapter	$195
Internal modem	$450
Printer cable	$45
Battery charger	$25
Automobile power adapter	$25
128K-byte random-access memory card	$195

COMMODORE

Commodore Rebirth?

by Cheryl Peterson

Strange that a company with the name Commodore Business Machines should be the largest seller of home computers, but there are few who would deny that it is so. In fact, Commodore "home computers" appear to be run away best sellers compared to their own business computers. While Commodore offers a line of business computers in Europe, it doesn't sell its IBM compatible and CP/M machines stateside. Perhaps they feel that their "toystore" image would prevent them from making any kind of dent in the business computer field.

One problem with the debate over "home," "personal" and "business" computers, is that there is no real definite line as to what each type is. Some analysts draw the line at a price. Some say that where a computer is used the most determines its category. Others say that the computer's type is determined by what the company chooses to call its product. Still others claim that the use the computer is put to determines its type.

I have a number of computers living at my house. Some belong to me, others are on loan from business associates, hardware vendors and friends. All are used primarily for business purposes. So by some folks definition, the C-64, Osborne 1s, C-128, Macintosh and Amiga computers which I use are all "business" computers. Yes, even the Commodores. In fact, especially the Commodores since without them it would be impossible for me to do software reviews of C-64 products. I readily admit that I am not a typical computer buyer and perhaps the definition doesn't stand up in my case.

Some determine the difference in computers by using the price at which they sell as the deciding factor. Few remember that a full VIC-20 or C-64 system cost approximately $1000 when they were introduced. Just about what you'd pay for a C-128 system when it was introduced last August. With the special offer being given on an Amiga now, $1295 will get the machine, disk drive and a monitor IBM PC clone with 2 disk drives now sell for less than $1,000. Does that make it a home computer or personal computer? Where do you draw the line? What separates a home computer from a personal computer from a business computer?

For the sake of this article, I am going to "define" a home computer as one that is used in the home. Whether for business, personal or private use, a computer used in a home is now a "home computer!" (At least until this article is done.)

Last April (1985), I had one of the worst experiences of my life. I attended SoftCon in Atlanta. Unwittingly, I was really looking forward to all the new home computer products. Imagine my surprise when the guest speakers started the conference on the theme "DEATH of the home computer market." Industry leaders sat before the computer dealers and product development teams telling them that the home computer market was dead. In fact, they claimed it had never existed.

As a writer, I was shocked to learn this. Almost all my articles had appeared in home computer magazines. Except for an occasional foray into articles on small business uses of a personal computer, I generally concentrated on uses of the machine at home. Come to find out, what these wonderful analysts had decided was that anyone who uses a computer for anything besides playing games is a business user. Therefore since most people don't spend $1000 on just a toy for the kids, all those "home computers" out there were really "personal computers."

By their definition, sure enough, the home market was dead. Sales of computer games had dropped through the floor as kids destroyed the market by "pirating" companies right out of the games field. The personal productivity software on computers like the C-64 was still selling, as buyers recognized the value of documentation and user support. But according to many "industry analysts" these buyers weren't home computer users.

Well, by my definition, a home computer is one that is used in the home. And a home computer user is one who uses their computer at home! In the last year, I have come in contact with quite a few "home computer" users. An editorial I did on software piracy garnered me several hundred letters from opinionated

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PPD
(Parallel Printer Driver Program)

by Ted Drude

Introduction

The C-64 Parallel Printer Driver program (known hereafter as "PPD"), provides the software support needed to interface a Centronics™ compatible parallel printer to the Commodore 64's User Port. This version 3.0 of PPD has many new features and improvements over earlier versions. Included in version 3.0 is PETSCII to ASCII conversion, and 8K interrupt driven printer buffer, "hex dump" mode, BASIC LISTing feature, and several other enhancements which are fully described in these instructions.

"PPD 3.0" supersedes all previous versions for the C-64 and is the only version that will be supported on an ongoing basis. It is not currently implemented on the C-128 (in the 128 mode), the VIC-20, or any other Commodore models (Plus/4, etc.) Owners of these machines are encouraged to drop a postcard to the author. If there is sufficient interest, it is likely that PPD will be implemented on these other machines. A C-128 version of PPD is definitely planned for the future. (The disposition of previous versions of PPD is clarified in a later section of this article.)

PPD version 3.0 (and later) officially consists of the BASIC "PPD Creator," the PPD ML program, and the documentation file. It is being distributed and supported, through a unique marketing concept called "Shareware." This means, although copyrighted, it can

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Inside Commodore

By Ted Drude

This month we have got lots of stuff for you! The C-64 "User Port to Centronics" Parallel Printer Driver (also known as "PPD" version 3.0) is finally done and ready for your nimble fingers to type in. There's also some info about a really neat public domain utility: "Next Wedge", servicing your Commodore, and more observations about the current "Plus/4 blitz".

The rumor mill had plenty of fodder in April when Commodore Chairman Marshall Smith stepped down! The transition to the new CEO (a former Pepsico man....shades of John Sculley!) was fairly smooth though, and the ship still floats.

It was immediately announced that the Amiga and 1080 monitor combo was going to be discounted $500. This effectively brings the price of the 256K box under $1000 (something like $795, technically). That price is only good when you buy it with the $595 color monitor. It means you still have to lay out about $1300 for a basic system with no software (other than DOS and BASIC) and no printer.

P.C. Transformer Released

The long awaited Transformer is out. If you remember this is the software interface to the IBM PC that ws the surprise at the Amiga introduction in New Your. Ervin Bobo our Amiga columist has received a copy and will review it in the July issue of *Computer Shopper*.

I believe one other product that will probably contribute to the Amiga's eventual success is the "Amiga Genlock". This device attaches to the Amiga and allows it to digitally input, process, and output NTSC color video signals. It makes the Amiga into a video scanner, digitizer, frame grabber, and special effects generator. Existing devices with this capability now run in the tens and hundreds of thousands of dollars. The Amiga with Genlock can do it for just a few hundred.

The good news is that there are indications that Commodore is re-evaluating their dependence on the Amiga and diversifying the product mix. There is a persistent rumor that Commodore may soon introduce their PC-clones in the U.S. Maybe they will even follow Apple's lead and return to support the people that have been their most ardent supporters: the "low end" C-64 and C-128 users.

Latest News (and Rumors) on the Commodore Scene

While Amiga sales continue to slowly ramp-up, the C-128 appears to be taking off fast, in the right direction. Both the CPU and 1571 disk drive have had their price lowered since the first of the year, but they are being sold about as fast as they are made. No boxes seem to be waiting around at dealers very long.

Bantam has been shipping the sorely needed "AmigaDOS User's Manual" for some time now. The $27.95 paperback incorporates substantial information from three technical manuals in the Amiga developer's pack: the AmigaDOS User's Guide, the DOS Developer's Guide, and the DOS Technical Reference Manual. (Still missing from Bantam are the Intuition Manual, the "ROM" (Exec) Manual, and the Hardware Manual.)

C-128 users are still awaiting their C-128 Programmer's Reference Guide from Bantam. This was promised around the first of the year,

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First C-128 CP/M Column

by Cheryl Peterson

I can't say I was terribly surprised when Stan Veit suggested *Computer Shopper* needed a monthly column about CP/M on the Commodore 128. After all, he keeps track of all the important industry happenings and trends, and with the sale of a half million units, the Commodore 128 has become news. Commodore is having trouble meeting demand for the machine.

As with other Commodore products, the 128 will need a considerable user support group. The toll-free number to West Chester was disconnected shortly after Commodore's financial status took a downturn last December. Commodore appears to have expected more from the Amiga than it should have. The 128 totally eclipsed the Amiga as the machine to buy for Christmas of '86.

It seems the computer buying public has at last become a group of educated consumers. In all honesty, I love my Amiga. But the C-128 is a better buy and a better machine for the average person. There is definitely a "niche" market for the Amiga, but the C-128 is the computer for the masses.

By the way, just heard Commodore is offering a free 1080 monitor with the Amiga in a special sale scheduled for April. The sale is only on for a couple weeks, so look out for it if you're interested in an Amiga.

While the C-128 is fully capable of running most of the C-64 software marketed, part of the 128's attraction is the CP/M operating system that is sold with it. With a 128, you get three computers for the price of one. A Commodore 64, a Commodore 128 and a decent CP/M machine that is quite powerful once the user puts sufficient money and time into it.

In addition to their miscalculations of the machine's selling potential, Commodore blew it on providing support to software developers. They tried to convince those who had been developing products for the 64 to support the 128. They were happy to offer advice and a helping hand to established companies marketing C-64 software and totally ignored the majority of vendors who were marketing CP/M software. Oh yes, the few companies who were willing to hand over marketing procedures to Commodore were given plenty of assistance. But those who wanted to market the software themselves, those who could easily take a product they were already selling and make minimal changes to get it working with the 128, were totally ignored.

I know this because, as a long time CP/M user and product reviewer, I have a pretty good relationship with several companies marketing great software. When they attempted to get assistance in procurring 128s to test their software on, their phone calls were never returned. In one case, I contacted a company to tell them I had tried to run their software and had been fairly successful. Because of this, they were interested in testing the product on a 128 and assuring themselves that it did work. Their calls to Commodore went unanswered, so it was months before they started offering a 128 version.

Numerous other companies could be supporting the 128, but Commodore's attitude has not encouraged them to try. Accordingly, this column will be one place where you can find news of CP/M software that does run and is being supported on the 128. I'll be tracking both commercial and public domain programs. Commercial developers who want a bit of free publicity can send information and copies of their 128 version software to *Computer Shopper* and they will be forwarded to me for use in the column.

I've had a 128 on hand since October of last year and have enjoyed it for the most part. Because I got a preproduction model, mine has a few flaws. The sound circuit is faulty and the cartridge port is flaky, but that is because it is an early model. Friends with store-bought models report no such problems. And I've used a friend's 128 enough to know which problems are my machine and which are not.

Missing an Important Part!

While the 128's CP/M Plus 3.0 is a respectable version of an old standard, there is a problem with it. One that buyers should be made aware of because it has been corrected. The original version does not address the user port. For anyone familiar with both the 128 and the world of CP/M, this deficiency is enough to make you wonder why you bought the machine. And you probably won't find out about it until after you've bought it.

For those beginning CP/M users who don't understand the importance, it basically means you can't use a modem with CP/M. Since most modems for the 128 and 64 use the user port, an operating system that can't talk to the user port is "dumb." (Meant in both senses of the word! Silent and stupid.)

One of the most commonly used sources of software for CP/M computers is public domain programs downloaded from electronic bulletin boards (BBSs). In order to work with CP/M, such programs must be downloaded using CP/M in order to put the files on CP/M readable disks. A translation program to take files from a C64 disk to a 128 CP/M disk is available but, I'm getting ahead of myself.

CP/M Plus Update

First problems first. Commodore has issued an updated version of the CP/M Plus operating system for the 128. They are not, as of this writing, offering it as an upgrade on disk. Instead, you must sign onto an electronic network and download a program that will modify your version of CP/M Plus. The electronic age IS upon us folks.

The program is currently available on QuantumLink, Viewtron and CompuServe. (Though Viewtron may be DEAD before you read this, I will give the info on how to get it there.)

Using your favorite telecommunications package and your trusty modem in C64 or C128 mode, sign onto the information network of your choice. You will need to download NEWSYS and C64TOCPM. (These files may be hiding under a different name but you'll recognize them by their function once you've read these instructions.)

Put the NEWSYS file onto a CP/M format disk using the C64TOCPM program. Make sure you are using a CP/M format disk with the system file on it. The instructions for using the transfer program should be available online. Since there are a couple different versions, you'll need to get the instructions for the version you use.

Once you've transferred NEWSYS to the CP/M disk, reboot the system to get into CP/M mode and run the program NEWSYS. It will modify your CP/M system file on the disk and rename the old file. You'll need to reboot the system to actually start using the new CP/M.

Where To Find It?

On CompuServe Information Service type GO CBM and choose the Software Update Option. It's all menu driven from there. On Viewtron type C64 SOFTWARE LIBRARY, choose the CP/M option,

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Parallel Printer Driver

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legally be copied for personal use among users, with some limitations. (The "Shareware" concept is more fully described in a later section. Please carefully read the "Shareware License" section in this article before making copies of PPD.)

Within the terms specified in the Shareware license, you may help distribute PPD by sharing complete and unmodified copies of the program and documentation with others. I encourage you to do this.

I also encourage you (and those to whom you have distributed the program) to "register" your copy of PPD if you find it a useful program. To register your copy of PPD send the $10 registration fee to the *Computer Shopper*. (Please make all checks payable to "Ted Drude".) In return, you will receive a 1541 format disk copy of the latest revision of PPD and other support files. Registered users are also entitled to certain benefits (such as user support and program updates) which are described in a later section.

Typing In the BASIC "PPD Creator"

One principle of the "Shareware" concept is the inexpensive distribution of software for use on a trial basis. In order for you to get a copy of PPD without having to first order the "registered" disk, a BASIC "PPD Creator" program has been included along with these instructions.

The "PPD Creator" is not the actual PPD program, but a BASIC program that will create the final machine language (ML) version of PPD on a disk, when it is run. Make sure you save the Creator program first, before you run it! (Since PPD is an all ML program, I had to resort to the BASIC "PPD Creator" in order to publish it in the *Computer Shopper.)*

When the "PPD Creator" program is run, it will first compute a simple checksum on all its DATA statements and check for typographical errors. If errors are found, the program stops. It will continue to stop until the errors are corrected.

If no data errors are found, the program then prompts for a filename for the PPD ML program about to be created. The PPD Creator will then attempt to re-create the PPD ML program as a disk file (about 10 disk blocks long, depending on revision).

After it's created, the PPD ML program can be LOADed as though it were a BASIC text file. When LISTed (before it is run), it will produce only a single line of text on the screen saying:

10 SYS2061

Hardware Needed to Run PPD

In addition to the PPD program, you will also need a special "User Port to Centronics" cable, to interface your printer. You can buy preassembled cables from several sources (Royal, RTC, and Swintech, among others). Or, you can build your own from common parts.

Detailed plans for the construction of a User Port interface for PPD was presented in the April and August '85 issues of the *Computer Shopper* magazine. Unfortunately, reprints of those articles are not available from either the author or the *Computer Shopper*, at this time. A table has been included (with other tables at end of this article), for those who want to construct their own cable, which gives the proper User Port to Centronics wiring diagram for PPD.

I plan on providing high quality parallel interface hardware kits (and assembled cables for those who would rather purchase them) at reasonable prices. Each cable hardware kit includes instructions and a registered copy of the latest version of PPD. Price for the complete kit package, including hardware and software, is expected to run under $30 (assembled units slightly higher).

Starting and Initializing PPD

PPD is a machine language (ML) device driver that LOADs and SAVEs like a BASIC text file. To initialize PPD for use, you simply LOAD and RUN the main ML program. The ML code will then be automatically install-

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APPLE

Ask The Guru

by Don Lancaster

Publishing deadlines being what they are, I am actually writing this a few days before the West Coast Computer Faire. But, if I got there, and if you got there, and if the great quake of '86 is behind schedule, many thanks for stopping in and visiting.

As usual, this is your column and you can get technical help per the ending box. I also have some new freebies for you. Besides the Applewriter/Laserwriter demo pack, you can now pick up free handouts on RS-232-C interfacing and the ASCII code. Just call or write.

New products include my disassembly script for the Apple 1 megabyte RAM card. This script shows all the innermost secrets of the formatting and disk access firmware, including some things Apple may not want you to know about.

As I mentioned last column, I like this card very much and think it is *the* way to go for both Apple II+ and IIe memory expansion.

Apparently *AST* agrees with me, since they have just knocked off a clone that imitates this Apple card. Their clone optionally piggybacks a second megabyte of RAM on the same card if you need it.

I've also just newly reprinted my *Micro Cookbook,* Volume I, so this once hard-to-get text is now back in stock here.

And now...

Care To Monger Any Apple Rumors?

There's sure enough of them to go around this month.

The *Apple IIx* is probably a reality and probably is in the hands of some super secret developers. It probably uses a modified 65816 CPU that is capable of emulating both the 6502 *and* the 68000, meaning it will run both Apple II and Macintosh software, or at least some of it. The memory will probably use 256K x 8 plug-in cards, similar to the Macintosh Plus. There will probably be some surface mounting.

Apple has also quietly introduced a new Apple IIe! It is different enough to have a new part number of A2S2100 instead of the old A2P2104. None of my spies know anything about this yet. My best guess is that it is only a minor modification to the main board that either lets or will let the IIe have a double-wide monitor toggled by a $C028 bit test. This is the same thing that has been done on the IIc to pick up compatibility with the new Protocol Converter stuff. If so, this means an SCSI interface for the IIe is just around the corner.

Apple has also introduced student rebates of $150 on an Apple IIe. To qualify, you have to be a full time student at a college, trade school, or university. Just about any employee at these institutions can also qualify.

They are also "opening up" the internal *Apple Link* telecommunications and bulletin board network. This net was originally intended only for dealers and developers, but selected user groups can now qualify. The first user group hour per month is free, and then $25 per hour after that to tap all of Apple's inside secrets and technical documentation. There is a ten hour per month use limit to prevent outright ripoffs.

Speaking of opening up, apparently tech information and tech literature is becoming much more available. For openers, there's three *Support Training Library* manuals available. Part numbers are 072-0187 for the Apple II; 072-0186 for the Macintosh; and 072-0188 for peripherals.

Technical note mailings are also now available. The 1985 Apple II tech notes cost $45 for a complete set, with a current bimonthly subscription available for $25. Similar Macintosh tech notes are $25 for 1985 and $25 for a current bimonthly subscription.

So much for the upbeat stuff. Now for the flip side.

The highly touted SANE *Standard Apple Numeric Environment* products have quietly been removed from some current price lists. I do not know whether it is an outright flush or simply some last minute bug repairs.

These packages are (were?) most useful for floating point mathematics and similar advanced calculations.

Worse yet, much of the DOS 3.3 support has been dropped. *The DOS Toolkit, DOS users manual,* and the *DOS Programmers manual* have been dropped from some current price lists.

What are the two single things Apple could do right now that would benefit them the most? (1) Unbundle the IIe and offer anybody and everybody a *very* substantial trade-in allowance for a II+, and (2) Make the servicing information and service routines *much* more widely available than they are now.

Why Are Applewriter WPL Routines Version Dependent?

WPL is the macro supervisory language used by most newer versions of Applewriter. Without WPL, Apple is an outstanding word processor. But with WPL, Applewriter is incomparable.

Many users are finding out that some WPL routines written for the older DOS 3.3e version of Applewriter will not run on the newer ProDOS Applewriter 2.0 or 2.1, and vice versa.

Why?

There are enough significant differences between the two versions that many, if not most, WPL routines will need at least some minor changes for both operating systems.

First, the DOS 3.3e version allows long filenames that includes spaces and some punctuation. The ProDOS filenames must start with a letter, can only be letters and numbers, and must be less than 16 characters long.

Second, the print constants files are wildly different, since the ProDOS print constant file has to tow along some serial port info. The names are also different. The DOS 3.3e Applewriter automatically *prefixes* a "PRT." to the print constants filename. ProDOS Applewriter automatically *postfixes* a ".PRT" tag.

Third, some of the functions have been renamed or renumbered. This is especially true of the [Q] Additional Functions command, and the [O] Disk Access commands. Some WPL routines may end up requesting the wrong action because of this relettering.

Fourth, disk-based text searches in the ProDOS Applewriter versions are *only* allowed to use the "|" as a delimiter. Many older DOS 3.3 disk-based searches used "/" instead.

Fifth, attempting to write to an existing file *may* produce a "Destroy Old File Y/N ?" prompt under ProDOS Applewriter. When this occurs under WPL, you have to add

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EquiDisk + High Capacity Drive For Apple CP/M

by Philip Chien

Many different disk drives have been made for the Apple II since the first Disk II was introduced in 1978. Most of the drives, including the various newer floppy drives from Apple Computer, emulate the Disk II, but there have been exceptions. Eight-inch, IBM mainframe compatible drives, a variety of hard drives, cassette drives, cartridges, stringy floppies (anybody remember those?) and even a 9" tape reel drive which reads standard industrial computer tapes have been made in Apple compatible versions. Apple computer once toyed with the idea of releasing a double version of the infamous "twiggy" drives used on the Lisa 1 Computer for the Apple II line, and even sent out press releases and preliminary units to developers. However, Apple stopped short of delivering the drives to the dealers. Rana Systems even made a unique double drive system which could read, write, and run many IBM PC programs along with normal Apple programs.

The EquiDisk+ is the newest Apple compatible drive, and one of the most interesting. What's special about the EquiDisk+ is that even though it uses standard 5¼" floppies, the drive will not read or write to standard Apple diskettes. But, it will store over 700K per floppy, on a double sided, double density 5¼" diskette, and the disk format is compatible with the Televideo CP/M format, and any normal CP/M program designed to work on a Televideo, or most other 5¼" CP/M diskettes should work in Apple CP/M without any modifications.

Besides the CP/M capabilities the EquiDisk+ also works with ProDOS and DOS 3.3. Unfortunately the Apple's Disk II uses the GCR disk format (Woz's invention), which is not compatible with the MFM format used by other computers, and the EquiDisk+ cannot use normal Apple formatted diskettes. Ironically enough, even though the EquiDisk+ can use diskettes made on other computers, it cannot use diskettes made on a normal Apple drive!

The EquiDisk+ was originally designed to assist CP/M users with massive CP/M libraries. Since it uses the MFM disk recording format used by most CP/M systems, the EquiDisk+ is compatible with many other CP/M diskettes. A special driver program configures the EquiDisk+ to look like a Televideo CP/M drive. When the drive is in the Televideo format various programs will let the drive read diskettes meant for other CP/M and MS DOS systems including Kaypro, Xerox, Osborne, IBM PC, TI Pro, and other brands. The EquiDisk+ can access most 5¼" disk formats which the Apple cannot normally use. No more stringing serial cables between your Apple and another CP/M system to transfer programs and files back and forth! If you have CP/M and an EquiDisk+ you can run most programs designed for other CP/M computers, within the limitations of your system. (e.g. If a program requires more memory than you have, a specific version of CP/M, a special terminal, or a special keyboard, it will not work without modifications.)

The EquiDisk+ is relatively easy to use. First you must boot the utility diskette on a standard Apple drive. The EquiDisk+ comes with two double sided Apple-formatted diskettes. One side supports

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The Toshiba P351 Printer

by Philip Chien

A most unusual printer for micro-computers, is the Toshiba P351 printer. Toshiba puts their printers into a category called "3 in one." The P351 printer is advertised as a letter quality printer, a dot-matrix printer, and a graphics printer all in one unit, but how well does it work in all three modes?

Quite well actually. Most present dot matrix printers have 9 print wires. These wires determine the vertical resolution of the character set. Originally dot matrix printers had 7 wires, and produced characters in a 5x7 or 7x7 matrix. The output was readable, and adequate for listings or in-house memos, but the quality left a lot to be desired. Since there were only 7 wires available, lowercase letters didn't have decenders ("g", "p" and "t") and underlining was difficult. 9 wires in a printhead allowed lower case decenders and underlining, but the 7x9, or 9x9 matrix still wasn't good enough for any serious correspondence. Many printers try to get better quality out of the 9 wire printheads by using multi-pass modes to obtain better quality output, but multi-pass mode slows down the output. Integral Data Systems got around the speed/quality problem by using a staggered wire combination to get a 24x9 matrix, and was still able to keep the print speed at over 100 characters-per-second. At the present time there are dozens of "near letter quality" mode printers (NQL), where it is very difficult to tell whether or not a dot matrix, or daisy wheel printer was used. Most of them use multi-pass modes with 9 wire printheads, but some of the newer printers have 18 wire printheads to make finer characters. Toshiba tops the other printers on the market by using a 24(!) wire printhead. The printwires, made through a special top-secret process, are about the same size as human hair. Toshiba's original intention when designing the printhead was to produce Katakana characters, the fine, and very complicated characters of the written Japanese alphabet. A nice by-product of their development work is the letter quality mode. It really is as good looking as a letter quality printer. The characters are well formed, and with serifs. A magnifying glass is needed to tell the difference between the Toshiba's output, and a typewriter's output. Figure #1 is a magnified "h" from the P351, and Figure #2 shows the various character sizes and fonts.

Besides the 100 CPS (characters-per-second) letter quality mode, the Toshiba also has a 250+ CPS draft quality mode. The draft quality is excellent for reports, in-house memos, and any other output where letter quality isn't needed. It is quite readable, and quite useful for spreadsheets, and large databases. The third mode on the Toshiba is the graphics mode. Granted, most dot matrix printers do some form of graphics, but the Toshiba has a 180x360 dot per inch resolution, almost as good as a laser printer!

The standard P351 comes as a friction-feed unit, and includes an automatic paper loader. The loader is very easy to use, and wastes very little paper on the top and bottom margins. The "paper out," detector and buffer make sure that no information will be lost when single sheets are used. Paper can be fed through the bottom of the printer, but the"paper-out" detector must be defeated to use this feature. I found it very easy to use letterheads and envelopes with the friction feeder. With the optional bi-directional tractors installed it was quite easy to use pre-printed forms, although I found it easiest to use the bottom feeder for tractor feed labels.



Toshiba P351 printer



Figure 1 P351 character

Since the Toshiba emulates a letter quality printer its not suprising to find out that there is also a single-sheet feeder available. What is suprising though, is that there are also "daisy wheels." ROM cartridges with a variety of alternate character sets are available as options, they are as easy to use as a daisy wheel, and are software selectable. Unfortunatly the socket for the fonts is on the back of the printer and fairly hard to reach. Hopefully this design flaw will be corrected in future models.

The hardware in the Toshiba is very sophisticated. A built-in sensor automatically reduces print speed when heavy black graphics areas are printed to protect the printhead from damage. The variable speed fan keeps the printer fairly quiet in the idle mode, but speeds up to protect the printer while it is printing. This is a VERY heavy duty printer. I accidentally dropped the P351 while carring it across my lawn. Nothing was broken, all I had to do was reattach the tractors which had fallen off.

continued on page 158

Figure #2: The Toshiba P351 built in fonts

High speed resident font - 10 cpi
This is the only font which can be condensed
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ°"†§ºº¼½¾¶¥ÄÖÜç~äöüß"éùè¨ƒ
shadow bold *italics* enlongated

High speed resident font - 12 cpi
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ°"†§ºº¼½¾¶¥ÄÖÜç~äöüß"éùè¨ƒ
shadow bold *italics* enlongated

High quality Prestige Elite font
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ°"†§ºº¼½¾¶¥ÄÖÜç~äöüß"éùè¨ƒ
shadow bold *italics* enlongated
Proportional: ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz

High quality Courier font
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ°"†§ºº¼½¾¶¥ÄÖÜç~äöüß"éùè¨ƒ
shadow bold *italics* enlongated
Proportional: ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz

High quality Proportional font
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ°"†§ºº¼½¾¶¥ÄÖÜç~äöüß"éùè¨ƒ
shadow bold *italics* enlongated

Sub & superscripts: $E = mc^2$ H_2O $2^3 = 8$

Block Graphics: ' ▚ ▞ ▙ ▟ ┌ ┬ ┤

Figure #3: How to set up Appleworks for the Toshiba

```
The Toshiba printer can be selected as a Qume printer from
Applework's printer menu, but if you want to use the extra
features on the Toshiba, you must setup a Custom printer.
The following data assumes that you know how to setup a
custom printer with Appleworks.  The built in Pica character
set is used for the 5 and 10 CPI modes, and the Elite set is
used for the 6 and 12 CPI modes.  The 16 CPI mode is in the
fast draft font.  Do NOT type in any spaces.  They are
included only for clarity.
-----------------
From the Printer Information sub-menu:

Interface cards:          CTRL-I 1 3 2 N Escape CTRL-Z I
-----------------
From the Characters per inch sub-menu:

5                         Escape * 2 Escape E 1 2 Escape !
6                         Escape * 1 Escape E 1 0 Escape !
10                        Escape * 2 Escape E 1 2 Escape "
12                        Escape * 1 Escape E 1 0 Escape "
16                        Escape * 0 Escape [

(other sizes and fonts are also available)
-----------------
From the Lines per Inch sub-menu:

6                         Escape L 0 8
8                         Escape L 0 6
-----------------
From the Enhancements sub-menu:

Boldface Begin:           Escape Q
Boldface End:             Escape R
Subscript Begin:          Escape U
Subscript End:            Escape D
Superscript Begin:        Escape D
Superscript End:          Escape U
-------------------
From the Underlining sub-menu:
Printer has start/stop underline commands:

Underline Begin:          Escape I
Underline End:            Escape J
-------------------
If you want to replace boldface with italics, use Escape
CTRL-R for Boldface Begin, and Escape CTRL-T for Boldface
End.
<end>
```

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
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)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|
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23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ àç
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ àç£
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ àç£`
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ àç£`µ°
```

Figure 4 High Quality Character Printing

MACINTOSH

MacUniverse

by L.J. Kutten

A Kick In The Pants

Recently I did a stunt so dumb that I still cannot believe I did it. It is the type of act that deserves a well placed kick in the pants. What was this dumb stunt? Well, in upgrading from a Mac 512 to a Mac+, I failed to verify in advance if my "must run" software *would* run. Well, it does not and I am stuck up the proverbial creek without a paddle. The offending hardware is a MacBottom 20 meg hard drive and the software is MacSpell+. Do not get me wrong, there is nothing wrong with either product. Both are excellent; they just have a "slight" incompatibility problem which makes them unable to work with the other.

MacSpell+ Update

Another place I blew it last month was in misreporting MacSpell+ speed. I said it would spell check 270 words per minute when used on a hard drive. I calculated that speed by clicking the MacSpell+ desk accessory, running the program, and dividing the number of words counted by the time it took. In talking to some people, I learned that was not the best way to determine its true speed. According to them, the longer the MacSpell+ is active the faster it gets. MacSpell+ is kept active by not closing its window; instead merely run MacWrite or Microsoft Word over it. You know something, they were dead right. I tried this method and within 15 minutes and checking two previous documents, MacSpell+ checked over 600 words per minute! Nothing I have seen in the competition even comes close to that speed. Now, more than ever, I recommend MacSpell+ to anyone who wants any easy to use spelling dictionary.

Wheels For The Mind Update

Apple Computer has changed the marketing plans of its *Wheels For The Mind* publication. *Wheels For The Mind* is published four times a year and is geared for the college students and faculty interested in educational uses of the Macintosh. A major part of each issue is descriptions of various software packages under development around the country. I get my copy at a local university bookstore. However to Apple's credit, it realized that more people than just college students and professors were interested in this type of information. Accordingly, *Wheels For The Mind* is now available to the general public by subscription. Four issues (one year) will cost $16.

If you have any interest in academic uses for the Macintosh, get it. It will be the best $16 you ever spent.

LaserWriter Tip

If you use a floppy based Macintosh to control a LaserWriter for word processing, try this "trick" for saving valuable disk space: remove all but one size of each LaserWriter font from the system file. When typing on screen set the font size to that desired (so long as it is one of the sizes the font actually comes in). On the Macintosh screen the font will look horrible; but when printed out on the LaserWriter, the font will look perfect. The reason why is simple. The fonts in all various sizes and styles are already stored on ROM in the Laserwriter. This means the LaserWriter does not need the bit graphics from the screen or system file to print out that font.

MacDraw Update

If you have version 1.7 of MacDraw, run, do not walk your master disk to your Apple dealer and upgrade it to version 1.9. Until then, be extremely careful when answering "Yes" or "No" in dialog boxes. It seems that a very nasty bug exist in 1.7 and that clicking on the background, text, and the like can cause the system to crash. This will destroy the document being worked on.

Mac+ Adaptor Cables

If you have a Mac+ and need adaptor cables to hook up your favorite peripherals, contact Harbor Electronics in Ridgefield, Connecticut. For $18.50 they will sell you the appropriate cable, I called on a Monday and had UPS delivery by Friday. Their WATS number is (800) 243-4794 and takes Mastercard or Visa.

As a side note, Harbor Electronics is to be commended for its approach to customer service. The day my original adaptor cable came in, I received a call from the customer service department saying they determined that one day's batch of cables was defective. Would I please check mine out immediately and let them know if it works. I did and it was defective. I called them back (on their WATS line) and it was shipped UPS Red Label ($11.50 at their cost) a replacement cable the next day.

A Case Of Fraud?

It appears Apple has a miniscandal brewing with practices of some of its former dealers. According to the scenario, a customer took a 128K Mac into the dealer to have it upgraded to 512K. The dealer charged the official upgrade price and the customer walked out with a 512K Mac. Later, the customer contacted another dealer about the upgrade to the Mac+ and was told he had to bring the unit in for an inspection. At that time, the second dealer informed the customer that a third party memory upgrade had been installed and the upgrade fee to the Mac+ was $799 instead of $599. The customers have complained to Apple but supposedly Apple is saying it is not responsible. If this story is true, and I believe it is, Apple should bear the loss, not the customer. Part of the implied contract in dealing with an authorized dealer is that Apple has checked out the dealer and vouches for him. Surely Apple corporate headquarters should have known that certain dealers were selling less than the norm for 128K to 512K upgrades. It was Apple's duty to check out this situation before the customer got burned and not expect the customer to bear the loss.

An Unnecesary Book?

The marketing decisions of some book publishers amaze me. Recently I received *Short, Simple, and BASIC: 59 Business Programs On The Macintosh For The Smart Manager* by Mark Robinson and Terry Kepner. It contains 59 business and financial analysis programs written in Microsoft Basic. The programs are broken into four main areas: Management Utilities; Management Decision Making; Accountant's Helper; and Time is Money. Such programs as computing the number of days between dates, computing straight line depreciation, and computing the sales price of an item before sales tax are printed.

For the most part the programs are very simple. Many are less than 15 lines (the longest is 8 pages) and would be very easy to prepare on a spreadsheet. For each program, there is a description of what it does, a program listing, and a line number/variable cross reference.

This book is only worthwhile if you already own Microsoft Basic and do not own a spreadsheet program. If you have to buy Basic, pay a little bit more and buy Multiplan. Then go to your local library an check out a book of financial formulae using Multiplan (e.g. *Financial Calculations For Multiplan* published by Prentice-Hall is excellent even though it is oriented for IBM Multiplan). You will be able to do much more powerful calculations than with the programs contained in this book.

Short, Simple, and BASIC: 59 Business Programs On The Macintosh For The Smart Manager is published by Scott Foresman and Company. It has a suggested list price of $18.95. For an extra $29.95 you can order a diskette that contains the book's programs.

Mac+ Sales

There have been a number of reports claiming that Apple

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New Macintosh Plus and Hyperdrive Upgrade Programs

General Computer Corp. announced three separate upgrade programs for the company's line of HyperDrive internal hard disk products for the Apple Macintosh personal computer. The upgrade packages will allow Macintosh owners to upgrade from a Macintosh 512K to a Macintosh Plus, from a HyperDrive to a HyperDrive 20, and from a HyperDrive or HyperDrive 20 to a HyperDrive 2000.

All three upgrade packages will be available only through General Computer's network of 1,300 dealers in the United States and its international distributors. Dealer installation, included in the price of the upgrade, is required.

Macintosh Plus Upgrade

In conjunction with Apple Computer's plan to provide upgrade kits for converting 512K Macintosh computers into Macintosh Plus machines, General Computer will offer two Macintosh Plus upgrade packages for HyperDrive and HyperDrive 20 owners. HyperDrive owners who install one of Apple's new 800K disk drive still also need to purchase an $89 General Computer upgrade that includes new system software and HyperDrive read-only memory (ROM), a drive bracket and drive cable, and a new user's manual. Macintosh owners who replace the logic board in their machines must install a more extensive $299 General Computer upgrade that includes these components as well as a new HyperDrive controller board.

John Ison, General Computer's director of product planning, said, "These upgrades make existing HyperDrives completely compatible with the new Macintosh Plus ROM software and 800K floppy disk drives. As an exta benefit, the changes speed up the HyperDrive itself, so it delivers even better performance than hard disks that rely on the new Macintosh SCSI port."

General Computer plans to continue to focus its product development effort on high-performance products. In June, the company will ship two new products--HyperDrive 2000, a high-speed coprocessor board and internal hard disk and HyperNet, and AppleTalk file server software program.

For additional information contact General Computer, 215 First Street, Cambridge, MA 02142; (617) 492-5500.

Mention that you read about it in *Computer Shopper*. ●

Professional Macintosh Color Graphics Presentation/Desktop Publishing Software

Cricket Software announced Cricket Graph, the first Macintosh software package to offer color presentation graphics and page layout for science and business.

Cricket Graph is the first Macintosh software to offer the 12 most popular science and business graph and chart types: scatter, line, area, bar, column, pie, stacked bar, stacked column, polar, quality control, double Y, and text. Cricket Graph allows for high quality plotting over 2000 data points per series--compared to 64 in Chart and 100 in Excel. It also allows for unique regression curve fits, 3-D "depth," and "error bars" to indicate confidence regions.

Imports From Excel, Jazz, Other Software, Using Switcher

Cricket Graph lets you enter data in rows and columns in a spreadsheet-like form, or import it directly from SYLK (Multiplan, Chart, Excel, Omnis 3, or OverVUE) files, text-only (MacWrite or Microsoft Word) files, Cricket Software's StatWorks statistical software, or from Jazz and other applications via the clipboard. You can import data from mainframes or Macintosh data bases in tab-delimited format. You can also save graphs in PICT form, allowing for exporting directly to MacDraw, MacDraft, and PageMaker. Switcher is bundled with Cricket Graph for fast data transfer to and from other applications.

Powerful Data Manipulation

Cricket Graph offers a variety of powerful data manipulation and editing capabilities. Data can be sorted, grouped by ranges of values, smoothed, and transformed by logarithmic, trigonometric, exponential, and statistical functions. You can edit the graph or chart by simply clicking on any portion. A dialog box allows for changing axis tick marks and labels, plot symbols, and bar patterns. And you can resize the plot frame and explode pie chart segments.

You can enter text for labels and legends in all available styles, sizes and fonts, along with lines, arrows, rectangles and rounded rectangles. And "graphic macros" allow you to save standard formats in icon-identified files for future use and for distribution throughout an organization.

Color Printing, Plotting, and Slides

Cricket Graph is the first Macintosh graphing application to offer color support. You can assign any of eight printer ribbon or pen hues and 16 fill patterns, allowing for 128 different colors.

Cricket Graph supports color printing on the Apple ImageWrite II, Apple Color Plotter, and Hewlett-Packard 7475A and 7470A color plotters, as well as black and white printing on the ImageWriter and LaserWriter (including transparencies).

Special versions of Cricket Graph are available for 13 other color printers, including the Xerox 6500 color laser, Tektronix 4691 and 4695 color inkjets, Benson Colorscan inkjet, Seiko D-Scan CH-5201B, Applicon AP5500, Diablo Series C, Printacolor GP-1040, ACT-2, Versatec ECP-42 color electrostatic, Trilog C100 Colorplot, Lasergraphics CPS-200, and Gulton CP-80C.

Special versions of Cricket Graph also allow for creation of color transparencies (35 mm to 8x10 inches, including instant Polaroid photographs) on the Dunn Instruments "Color Macintosh" slide-making system (which bundles Cricket Graph software and the MacPaint-like Dunn Color software with the Dunn MicroColor film recorder), as well as the Matrix QCR and Lasergraphics MPS-2000 film recorders.

Page Layout

Cricket Graph includes a unique multiple-graph page layout capability. Up to ten graphs can be moved, resized, overlayed, and otherwise positioned on a page for what-you-see-is-what-you-get printing.

Cricket Graph stores its graphics internally in PICT files rather than bit-mapped files, so it is not limited to the resolution of the Macintosh screen or LaserWriter--it redraws all graphics at the full resolution of the output device, allowing for very high-resolution plotting, for example. Color information is retained even when the graphs are passed to MacWrite, Word, and PageMaker, allowing these black-and-white applications to print graphics in color.

Cricket Graph color charts and graphs can be imported directly into MacPublisher II and merged with color text and images to create eight-color newsletters, newspapers, and other documents, using the ImageWriter II printer.

According to Cricket Software President Darragh Muldoon, "Cricket Graph fills an often-expressed need in corporations and other organizations for serious presentation-quality graphing software on the Macintosh. Cricket Graph overcomes the graphing limitations of Chart, Excel, and Jazz and offers the power of mainframe-style graphics software at a fraction of the price,

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MacMoney Announced For The Macintosh

Survivor Software Ltd. announces MacMoney, a financial record keeper and financial planner designed and written especially for the Macintosh with the user in mind. This is an enhanced program by the authors of "The Home Accountant and Financial Planner for the Macintosh by Arrays, Inc., a public corporation of Van Nuys, CA. Full data compatibility with the Arrays' program has been retained and trade-in packages will be made available.

A special introductory price of $74.95 (plus shipping/handling) will be made available. A 30-day limited money-back guarantee will also be offered (contact Survivor Software Ltd. for further details). Delivery is scheduled to begin in June of 1986.

The authors of MacMoney have made several enhancements to this financial program increasing its user appeal. New features include data exporting capabilities in a tab-delimited format to a text file. This allows other programs such as Excel, Word or MacWrite to use MacMoney's data without requiring the user to re-enter that data. The maximum number of transactions has been doubled (depending on user hardware). MacMoney now allows reports and graphs to be printed on the Laserwriter as well as the Imagewriter.

Other key features of MacMoney include a new User's Guide containing extensive everyday examples of ways to use the program. MacMoney allows up to a total of 200 bank account, cash account, credit card, income, expense, asset and liability categories. It also keeps the names and addresses of people or businesses for use when printing checks. Optional budgeting features are provided to add dimension to financial decisions and planning.

The reports include income & Expense Statements, Asset and Liability Reports, Transaction Activity Reports, plus many Custom Reports. A whole range of charting functions may be displayed or printed, including standard or custom bar and line graphs, or 3-D pie charts. In addition to its accounting features, MacMoney includes a financial planning package which allows the user to do loan, retirement, and financial goal planning. Amortization schedules for existing or new loans can be printed.

MacMoney has been praised for its adherence to the "Macintosh Interface" which increases its ease of use and shortens the time needed to learn the program. Anyone who has used MacWrite or MacPaint has learned how to us MacMoney.

MacMoney will be released in an unprotected format to provide simple hard disk installation and use and to allow the user to easily backup this software investment. A 512K Macintosh is all that is needed to run this program and it is fully compatible with the HFS Finder 5.x.

Survivor Software Ltd. recognizes the need for strong customer support through the traditional medium of mail and telephone, as well as quick response via electronic mail. It is their policy to serve that need. Mike Farmer, President and one of the authors, stated, "Excellent support for our excellent program is very important to us."

For more information contact Survivor Software, Ltd., 11222 La Cienega Blvd., Suite 450, Inglewood, CA 90304; (213) 410-9527.

Mention that you read about it in *Computer Shopper*. ●

Odesta Announces Consulting Services For Helix Customers

Odesta Corporation has announced a Consulting Service and an Application Design Service for customers using Double Helix, Odesta's application building environment for Apple Computer's Macintosh personal computer. These new programs provide a full range of application development services to business people interested in custom packages.

The Odesta Consulting Service provides individual assistance on advanced Double Helix techniques and optimizing specific applications. The Odesta Design Service designs and develops full custom packages for individual businesses on a contractual basis. The new services complement the free technical support already offered to all registered Helix owners.

Developed in response to demand from Odesta's growing installed base, the two services will be staffed by in-house Helix consultants. The Consulting Service and the Design Service may be contacted by registered Helix owners through Odesta's toll-free customer support number.

"The new services reflect our complete commitment to our customers," said Daniel Cheifetz, president of Odesta. "For the first time, Helix users can take advantage of our internal knowledge of sophisticated application design techniques."

Starting on April 1, 1986, the Odesta Consulting Service was available for $60.00 an hour, clocked in segments of ten minutes. The Odesta Design Service fees are determined on an individual basis according to the complexity of the application requested.

Odesta Corporation designs, develops, and markets a range of software products for business people and professionals.

For further information contact Odesta, 4084 Commercial Avenue, Northbrook, Illinois 60062. (312) 498-5615.

Mention that you read about it in *Computer Shopper*. ●

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AT PART SPECIAL:

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AT hard disk Seagate 30MB (½ height)	$750
AT Keyboard	$109
AT Motherboard with legal award BIOS (512K)	$995
AT Multifunction card with serial & serial port (OK)	$209
AT Parallel & Serial Port Card	$89
AT Power supply 200 W or higher	$159
AT MS-DOS (with GWBASIC)	$85



XT VERSION:

Case XT (slide out)	$59
Color Card with Graphic	$75
Color card with printer port	$85
Disk Driver controller with cable (2 adapter)	$39
Disk driver controller with cable (4 adapter)	$49
EPROM writer card with manual & software (external)	$119
Game Card	$25
Joystick for IBM	$20
Floppy SK drive Panasonic 455	$95
Floppy SK Drive Seagate 20 MB (controller)	$379
Hard disk controller (DTC, WDC)	$139
Keyboard 5150 compatible	$79
Keyboard 5151 compatible	$99
Keyboard 5060 AT & XT compatible	$119
Modem 1200B Inter	$169
Modem 1200 Exter	$179
Monochrome Graphic Adapter with printer adapter (Hercules Compatible)	$99
Motherboard compatible for XT 8 slot, 640K	$249
Motherboard compatible for XT 8 slot, 256K	$199
Motherboard compatible for XT 8 slot, 0K	$149
Mouse	$79
Multifunction card (OK)	$89
Multidisplay (color/mono)	$179
Multi I/O card with floppy driver adapter P.S.C.	$119
Printer cable	$8
Printer card	$28
Printer A-B switch	$49
RAM memory card (0-512K)	$59
RAM memory 4164/41256	$CALL
RS-232 card	$34
RS-232 cable	$8
RGB Monitor	$299
Turbo Main board (4.77 MHZ, 6.77 MHZ)	$199
XT Power Supply 135/150 W	$99
TTL Monitor	$109

DEALER INQUIRY WELCOME



AT SPECIFICATION:

- 80286 True 16 bit micro processor
- 6 MHz clock rate, same as iBM
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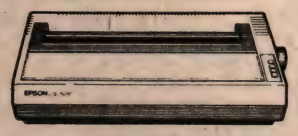
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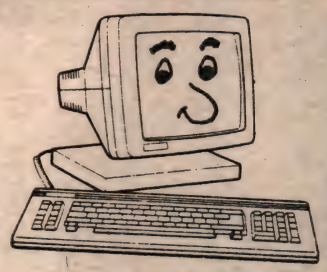
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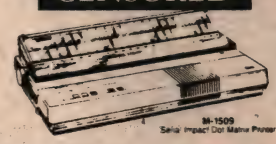
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ATARI ST

Hacking The Atari ST

by Wynn Rostek

This month I would like to go over some extended bios calls, tell you a little about the extents used for executable files and start a small hardware project. I'll also tell you about the AUTO folder. Hang on to your hat, this is going to be a whirlwind.

Often I receive several letters on the same subject, so we address the request in the column. A prime example is the memory upgrade. We received letters from ST owners from Florida to Australia to Saudi Arabia. Since there was so much interest in the memory mod, we wrote an article on how to do it, complete with photographs and drawings.

If there are enough requests on any particular subject, I'll provide answers in this column. One item of interest to many of our readers seems to be how to contact the ST National Users Group. The ST National Users Group can be reached by writing to:

ST National Users Group
3650 Sand CT.
Mims, FL 32754

The ST National Users Group BBS can be reached by calling: (305) 383-1413.

The BBS is up 24 hours a day, 7 days a week, 365 days a year. Please use 8 bits no parity when calling. The BBS is 300/1200 baud and has a public section open to everyone, member and non-member alike. Non-members may download files and read and leave messages. This BBS is ST only, and its main goal is technical support of the ST and supplying public domain utility programs for the ST.

R.A. Rieck of Rochester Minnesota wants to know how to obtain the 13 pin connectors used by the monitors on the ST. So far we have not found a source for the connector in question, but several members of the Users Group are still looking for them. I'm sure news will be posted on the ST UG BBS as soon as a source is located. He would also like to know how to obtain a copy of CHAT, the telecommunications program my company markets. If your local dealer does not carry CHAT, you can write to:

SST Systems
P.O. Box 2315
Titusville, FL 32781
(305) 269-0063

CHAT is $19.95 plus $2.50 postage and handling. If you need quick delivery, UPS Blue delivery is $1 extra.

You may have noticed that there are three common extents for executable files on the ST. Most programs will have a name like SAMPLE.PRG. Some programs have names like SAMPLE.TOS or SAMPLE.TTP. The extents PRG, TTP and TOS tell the computer what kind of environment the program runs in.

A program with an extent (last name) of PRG is a graphics program. When the computer loads the program, it will set up the screen for graphics display. On a color system, the screen will be cleared to a solid green, the monochrome systems clear to a grey. The system also has a white bar across the top where the menu bar is displayed. If the program does not display a menu bar, then the system will display the program name in the center of the white bar.

A program with a TOS extent is one that works in a text mode. For a TOS program, the computer will clear the screen to solid white. It also places a rectangular cursor on the screen. This preparation is useful for programs like text editors and terminal programs where the screen handles mainly (or only) text.

The TTP extent is very much like the TOS except that the user is presented with a parameter alert box. The parameter alert box appears on the screen before the program is run. You may type information on the line in the alert, and it has an OK and a CANCEL box you can click. The OK box has the same effect as the Return key. The CANCEL box can be used to return to the desk top if you change your mind about running the program.

The information typed on the line in the alert box is passed to the program when the program is loaded into the machine. Many programs are more useful if they can use command line arguments. Command line arguments are strings of characters that appear after the program name in normal (Non graphics) systems. An example of a program where command line arguments are normally used is a filter program. A filter program passes the text from a file through itself, changing the text in some way, and leaves the changed file on disk.

Filter programs and text editors often need the name of the file that they will be working on. On most systems, they take the file name as a command line argument. Mince is a text editor that runs on many different machines. I have been using Mince on my CP/M system for four or five years now. On the CP/M system,

continued on page 214

Synapse Releases First Product For The Atari 520ST

Synapse's first product for the Atari 520ST computer is being released according to Doug Carlston, president of Broderbund Software, Inc. Synapse is a wholly owned subsidiary of Broderbund.

Mindwheel, a science fiction text adventure game, now is available for the new Atari computer as well as for the IBM PC, Apple II, Macintosh, Commodore 64/128 and Atari 400/800/XE/XL computers.

The game is a time journey through the minds of four people--a peace activist rock star, a monstrous dictator, a heroic poet and a gifted scientist. The player's goal is to retrieve the Wheel of Wisdom—the key to civilization's survival.

By featuring a vocabulary of 1,200 to 1,500 words for realistic dialogue with characters, **Mindwheel** lets players concentrate on strategy instead of spending time figuring out what words the game will understand. And it's played in real time so that while the player is deciding what to do next, the action continues.

"The game has been engineered specifically for the Atari ST," said Richard Sanford, Broderbund product manager for **Mindwheel**. "It uses the ST's interface and features pull-down menus, mouse and keyboard interface and the ability to make up dialogue and save it for future use."

Mindwheel for the Atari 520ST requires 512K of memory and has a suggested retail price of $44.95.

For more information contact Broderbund Software Inc., 17 Paul Drive, San Rafael, California 94903-2101, Telephone (415) 479-1170.

Mention that you read about it in *Computer Shopper*. ●

Personal Financial Advisor Now Available For The Atari 520ST

Financial Cookbook, a software product that helps people make personal financial decisions, is now available for the Atari 520 ST personal computer.

Introduced in May 1984, the program is already available for the Apple II, Commodore 64, Atari 800, IBM PC, Macintosh and Amiga. It has already received the Silver Certification from the Software Publishers Association, signifying more than 50,000 units sold.

"Financial Cookbook" contains 32 recipes, or formulas, that produce answers about taxes, investments, savings, mortgages, and other personal financial questions," said Trip Hawkins, president of Electronic Arts. "The program replaces the traditional calculator and spreadsheet approach, and can serve as a financial advisor. Our customers have found that it often pays for itself the first time it is used."

One key to the program's value is the complete instruction provided. It contains a tutorial, recipe instructions, and a 100-item index that helps users get answers right away. The manual provides easy-to-understand, thorough explanations of financial and tax issues and a 160-item glossary of financial terms.

Financial Cookbook provides answers to hundreds of questions such as: "How much do I need to save monthly to send my child to college in 6 years?" "Is it better to lease or buy a car?" "How will I be affected if I refinance my home at a different interest rate?"

Using the various recipes, any user, regardless of financial sophistication, can quickly figure such things as returns on investments, effective tax rates and the impact of IRA's, the effects of inflation, mortgage calculations, and tax rates. Each recipe asks the user to enter the variables, such as interest on inflation rates, and makes the calculations based on the figures entered.

All the figuring is done without the need for the user to build a complicated financial model or to have any knowledge of the complicated formulas behind the calculations.

Tax savings are particularly well covered in the Financial Cookbook. Calculations for 11 basic tax shelters available to most consumers are in the program.

Like all Electronic Arts personal productivity software, Financial Cookbook uses simple methods of interacting with the computer and a minimum number of keystrokes and commands. Those actions most often require the least conscious effort, so users quickly become competent in using the program. The Atari ST version also takes advantage of the pull-down menus, mouse interface and multiple windowing possible with the computer.

The program was written by Stan Trost with members of Electronic Arts' software staff. The suggested retail price is $49.95.

For more information contact Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7171.

Mention that you read about it in *Computer Shopper*. ●

Randy's Atari ST Column

by Randy Holcomb

This month we'll look at Personal Pascal from OSS, VIP Professional Lite from VIP Technologies, and a BBS for the ST. First, a side note on the memory upgrade article that appeared a few issues back. Several folks have made the comment that you should place 68-ohm resistors in series on *all* the RAS and CAS strobes coming off the MMU chip to minimize ringing and potential damage to the MMU and/or RAMS. This means that to install the resistors you have to cut board traces for the RAS and CAS lines for the memory on the board. I have been running my 1 meg upgrade since January without the resistors and have not run into this kind of problem; so the jury is out on installing the 68-ohm resistors. I can see installing them on the second bank of the RAM, but I dislike having to cut traces on PC boards especially when they are as close as they are on the ST Motherboard. Check your local BBS or the networks; several other installation docs are floating around which you might want to compare with the one that the *Shopper* published.

Personal Pascal from Optimized System Software (1221B Kentwood Avenue, San Jose, CA 95129; (408) 446-3099; $74.95 suggested price, not copy-protected) should be in the hands of *anyone* who wants to do *any* recreational or serious work on the ST. For starters, you get a ISO-based Pascal which generates native code and has some good compatibility with UCSD Pascal (UNIT and BLOCK I/O missing) but its *real* selling point is its documentation—it makes an attempt to explain how to get at all of the features available in the GEM environment and it does it in a very easy, coherent and at a level that isn't condescending to the intellect, and is downright *fun* to read! (When was the last time you ever heard that a manual was *fun* to read?) To give you an example, the *very* first thing they tell you to do is to backup the master disk and put the original in a box marked "Danger: Radioactive Waste" in your closet. Personal Pascal runs under the GEM Desktop and includes a screen editor and linker as part of the package. To invoke the system you double-click the PASCAL.PRG file from the desktop (double-clicking any of the other .PRG files in the Personal Pascal system just returns you back to the desktop). At this point you now have a menu bar that contains the ubiquitous "Desk" followed by "Files" and "Options" drop-down menus. The Files menu allows you to invoke the editor, compiler, the linker, run a (or any) program, and Quit. The Options menu allows you to tell how the compiler and the linker are to behave and allows you to save these setups in a PASCAL.INF file (akin to the "Save Desktop" function).

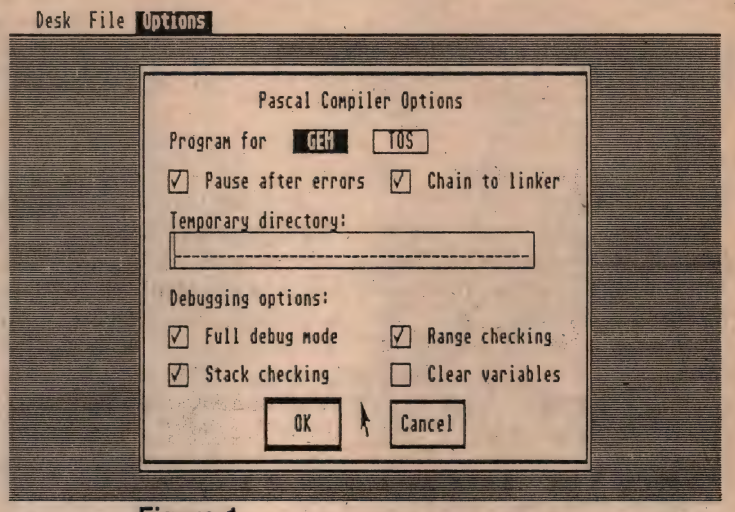


Figure 1
Compiler Options for Personal Pascal

The Editor in Personal Pascal uses the full screen and is a relatively nice editor to work with: those of you who have worked with WordStar will find that a number of the control sequences are supported by this editor. A nice feature of this editor is that in one keystroke it can save your source, exit the editor and invoke the compiler and proceed to compile the code you just saved.

The Compiler is a single-pass compiler that produces ".O" files which are run thru the linker to create the executable module which runs under GEM or TOS (depending on what you tell the system when you compile and link). Personal Pascal can also be told to link modules written in DRI's C or any languages that follows DRI's calling protocol. The version of the code I have made no mention of being able to write desk accessories using this language; I now understand that it is indeed possible to write accessories under Personal Pascal and that OSS has released an improved version of the language which improves the code generation process.

GEM Support. This is where OSS really shines. The manual (and the language) makes GEM support look trivial (even though it isn't) and take you one step at a time, stepping you from the easiest portions of GEM (the alert boxes and dialog boxes) up thru event management, mouse management, windows and menu management. Plenty of examples can be found in the INFO folder on the distribution disk for you to pillage and plunder to your hearts content to further your understanding of Personal Pascal's GEM calls. Also, you can make direct GEMDOS, BIOS and XBIOS calls too.

The Bottom Line: With *Personal Pascal* and the *Abacus ST Internals* and GEM reference books, who needs Atari's developer's kit?? I have seen Personal Pascal for as low as $55; combine that with the price of the two Abacus books at $40 for the set you basically get the equivalent that Atari charges $300 for. (OK, so Line $A008 isn't documented in the Abacus Internals manual and there are some holes here and there—I got $200 more for other software!)

VIP Professional Lite from VIP Technologies (132 Aero Camino, Santa Barbara, CA 93117; customer support phone (805) 685-3948; suggested retail $99.95, copy protected disk) is a scaled-down version of VIP Professional (suggested retail $179.95), a Lotus 1-2-3 work-alike. Lite has the same row and column size that 1-2-3 uses (2048x256) but lacks macros and the database facility-in essense, 1-2-3 with a lobotomy (VIP Professional gets you macros, database and 8192x256 grid size). Lite can read WKS files created by 1-2-3 and manipulate them with much the same ease as Lotus. A friend of mine saw me running VIP Lite and

continued on page 221

New Titles Available For Atari ST Software

In a strong show of support for Atari's ST line of personal computers, third party software developers have completed hundreds of new programs. Developers include companies such as Mictron, Batteries Included, Versasoft, Philon, Stoneware, Sierra On-Line, Activision, Spinnaker and Infocom in the fields of home productivity, business, education and entertainment.

"We have a major commitment to Atari's ST line," says Batteries Included president Michael Reichmann. "Our new ST drawing program, 'DEGAS,' has been a phenomenal success. In fact, we delivered more in the initial three weeks of shipping than we anticipated for our entire first year."

Mr. Reichmann also confirmed that Batteries Included has a dozen additional ST titles in active development including an advanced word processing program, "Paper Clip Elite," and "Isgur Portfolio Series," a personal investment analysis package.

Activision has announced that its "Music Studio" MIDI music program will ship this month in addition to its popular adventure titles, and Migraph, Inc. has shipped its first ST title, "Easy Draw."

In addition to entertainment titles, many of the new titles and much of the development are in the field of business or educational applications, says Atari executive vice president Michael V. Katz. Developers have recognized that the Atari 520ST and 1040ST are serious business or educational machines.

For example, Antic Software has introduced "Maps & Legends," an educational program for geography students. And in the area of business applications, "H&D Base," a full DBase II emulator, is now available and "dBMan," from Versasoft, a DBase III-like program, shipped last month.

Versasoft has been selling to the IBM market and Richard E. Post, vice president of sales and marketing, says the company is excited about the ST version. He says, "The availability of dBMan for the ST line will open up an entirely new market to the hundreds of existing high-quality DBASE applications."

At Haba Systems, president Chaz Haba says in addition to the eight productivity titles already shipping, his company will introduce up to seven more titles by the end of the second quarter. He says, "I believe the Atari ST will find its way into the business and educational community because of its low price point entry for absolutely fabulous performance."

A spokesman for Sierra On-Line, an early ST supporter with four programs currently shipping, says the company plans to ship six new ST titles, including its basic accounting package, "PC One Write," within the next quarter. "We've had great success with the ST line," the spokesman says. "We can't seem to keep up with requests for ST software."

Gordon Monnier, president of Michtron, says his company has shipped eight titles since January and expects to have up to 24 titles by summer and more than 30 by year's end. When asked if Michtron was committed to the new Atari line, Mr. Monnier said, "We have 25 programmers working full-time on the ST line."

Among programming languages, "Lattice C," from Antic, "Personal Pascal," from OSS and "Holmes & Duckworth Forth," from Mirage have all been introduced since January.

"We've seen an excellent response to the ST line, in everything from games to sophisticated programming tools," says Mr. Katz. "The list of software titles for the ST continues to grow with more created every week. During the next quarter, we expect the number of titles to double."

A list of ST software titles is available upon request.

For additional information contact Atari Corporation, 1196 Borregas Avenue, P.O. Box 3427, Sunnyvale, CA 94088-3427.

Mention that you read about it in *Computer Shopper*. ●

ATARI

Applying The Atari

by Jeff Brenner

This month's feature program is *BudgetMate*, our longest "Applying The Atari" program ever. The program was designed specifically in response to requests (in some cases pleadings and threats) from readers for a home budget program. We'll also take a look at some new products and reader mail.

New Products

In the March 1986 column we learned about all of the latest memory expansion products available for the Atari 800XL. For Atari 800 owners, Magna Systems announces the RAMCHARGER, a plug-in memory expansion board. While it's not 132XE-compatible, it does offer full Axlon compatibility and gives the user up to 288K of memory for Synfile + and Syncalc. The popular MYDOS ramdisk software is included with the board. 256K, 512K and 1 megabyte versions are available for under $150, $200 and $300, respectively. Contact: Magna Systems, 147-05 Sandford Ave. Suite 4E, Flushing, NY 11355.

Datamost, Inc. is marketing a line of educational software called MindWare. Each package consists of two cassettes containing voice-tracks that sound through the television speaker and complement the visual display. Reading, Math, English, Science, Personal Skills and Business development are the topics available. They're $24.95 per package. Contact DataMost, 21040 Nordhoff Street, Chatsworth, CA 91311.

Reader Mail

Dear Jeff,

Q. I plan to send at least 200 letters per week (for a mail order business). I want to keep all letters on file and correspondence (who did or did not correspond). I currently have: an Atari 800XL, 1050 Disk Drive, 1027 printer.

My questions: (1) Do you think I need another printer for more speed; if so, what would you recommend? (2) Is there a buffer for this printer or other printers which you recommend? (3) Can I still exchange DOS 3 for DOS 2.5?

Stuart G. Fowler
Anderson, South Carolina

A. The 1027 is an economical printer, but remember, it can only print 20 characters per second, so you can calculate how long it will take to print 200 letters per week. There are faster letter-quality printers available, but they are more costly, and you'll need a printer interface. Near Letter Quality (NLQ) is somewhat faster and various printer models offer both NLQ and draft modes. The Gemini SG10, for example, is very cost-effective, and features near-letter quality in addition to its draft mode. The Epson LQ series is even faster and has nicer looking output, but again, this model is more costly. Thus it all depends on how much you're willing to spend. Whatever you decide, you should visit a computer store before you buy and take a careful look at the print quality of each printer you are interested in to insure that you're satisfied with the print quality.

A printer buffer will help free up computer time while printing, and this would be particularly practical if you needed to change or add to each letter between printings. If you're buying an interface, you should certainly consider one with a built-in buffer. 16K, 32K, and 64K buffers are the most common sizes, and they vary in price according to memory size. The direct-connect 1027 cannot use the interface-buffer combination products since it does not require an interface.

To get DOS 2.5, send your DOS 3 disk to Atari Customer Relations, P.O. Box 61657, Sunnyvale, CA 94088.

Dear Jeff,

Q. Recently I learned through one of the local BBS's a particular game could be modified by changing a couple of locations and the program would be enhanced to perform better. This is great...but how do you get into the locations? When the program is listed, all you get are the typical Atari arrow, hearts, squares, etc. How do you convert it to something that can be made sense of?

Gary Robinson
Cedar, Minnesota

A. Since you are not specific about what "locations" you were directed to change, it is difficult for me to determine what you need to do. What you can do is write me again describing specifically what you were told to change and I'll help you personally. For other readers, I'll briefly discuss a couple of techniques that are involved in changing various types of programs.

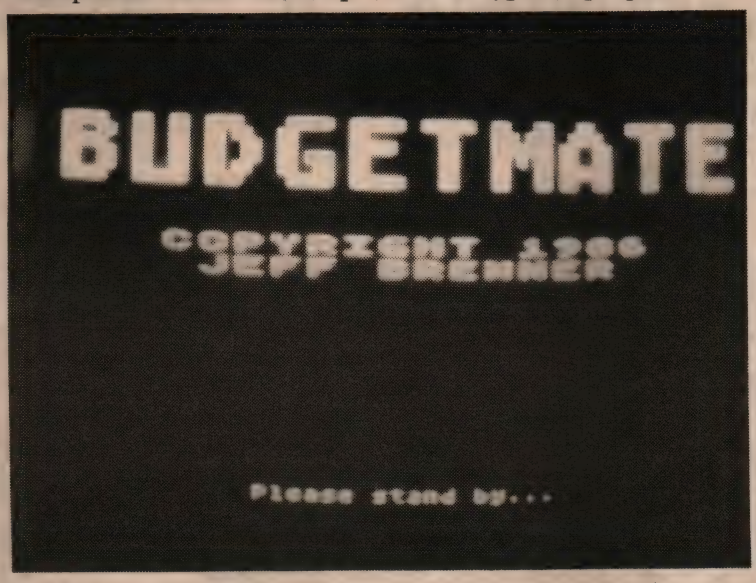


Photo 1 "First Screen"

For a BASIC program (and I assume your program is in BASIC since you say you can list it), you should be told a particular line to change, or shown a group of characters to change on a specific line. A "location" can't really tell you anything in a BASIC program; you need a line number. What a location can mean, though, is a memory location that you should POKE with a particular value. For example, you might be instructed to store a five in location 82, in which case you'd type POKE 82,5 before running a program. This particular poke would change the left-hand screen margin.

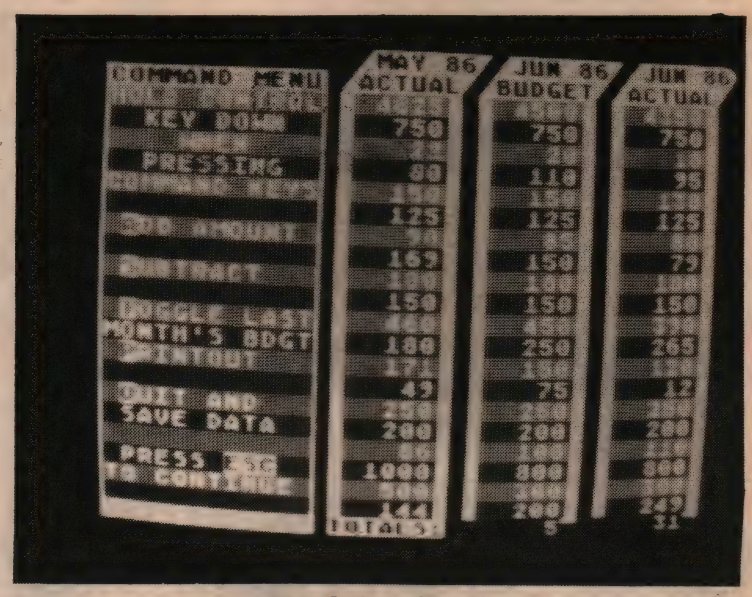


Photo 2 "Menu Screen"

A machine language program presents an entirely different situation. In such a case you would generally need a disk utility to be able to change specified portions or bytes on a disk. For example, you might be told to alter a specific sector/byte location, or to change a series of values at a particular section/byte location. In both cases, a disk sector utility is necessary.

Dear Jeff,

Q. Your answer to H. Wayne Shiver in the *Computer Shopper* for March 1986 is not quite correct. Microperipheral modems were made by the Microperipheral Corporation in Redmond, Washington. In other words, "It ain't MPP!"

A friend here has one of these and is having the same problems finding programs to work with it. There seems to be little available information on these modems, indicating that they were not very popular or that many are confused with the name similarity.

Aaron G. Todd
Los Angeles, California

A. Oops! You're absolutely right, Aaron. Microperipheral Corp. is not Microbits Peripheral Products. That's the problem with a lot of computer company names; they sound too much alike. Nevertheless, I apologize to Wayne Shiver and to anyone I might have caused only more confusion. You and the following reader were the only ones who caught my goof:

Dear Jeff,

Q. I was just reading your March "Atari Help" column and I believe you misread the letter from H. Wayne Shiver of Powder Springs, GA.

He stated he owned a Microperipheral Corp. modem. This company has often been confused with the formerly named "MPP Corp." but it is a different company from Washington, not Oregon. They used to manufacture modems under the name "Microconnection" for various computers, two models for the Atari. One was an 850 connected model and the other was for use without the 850, either a joystick port or I/0 daisy chain connection, I'm not sure which.

I owned an 850 connect model for years and was completely satisfied with its operation. It used its own autodial routine, not compatible with Hayes, but several public domain Amodem programs supported it, namely the earlier versions of Amodem Plus v. 1.85 and variants, up to Amodem 6.3 which was the best. Later versions like Amodem 7.1 worked fine but did support the autodial.

I suspect that Mr. Shiver may be using the non-850 version of the modem which explains why Amodem and HomeTerm give a modem error. You are correct that he needs the correct handler for his modem, but it may not be the MPP handler, although if his modem uses the joystick port, one of the MPP handlers might get his modem recognized.

continued on next

Applying The Atari
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Without more specific information on the model of his modem, I cannot think of any more ideas to help him. The Microperipheral Corp. produced a number of early terminal programs which they did not ship with the modem called *T Smart and S Smart*, and required that the proper AUTORUN.SYS handler be booted for the modem. I recommend neither program. In fact, I recommend none of the commercial terminal software for Atari. Public domain terminal software is far superior to anything you can buy on the market.

Frank Halters
Panama City, Florida

performance. Hope this helps."

Many thanks to Ricky for writing in with this solution. Readers who want to make this modification but are uncomfortable with soldering or electronics can probably find assistance at a users' group.

Reader Requests

Readers have been so responsive and helpful in the past in discovering software items such as genealogical programs, and hardware products, such as memory expansion boards, that beginning next month I will be including a "Reader Request" section to help readers locate hard-to-find Atari items, or even to see if such items exist. Have a particular request? Let me know.

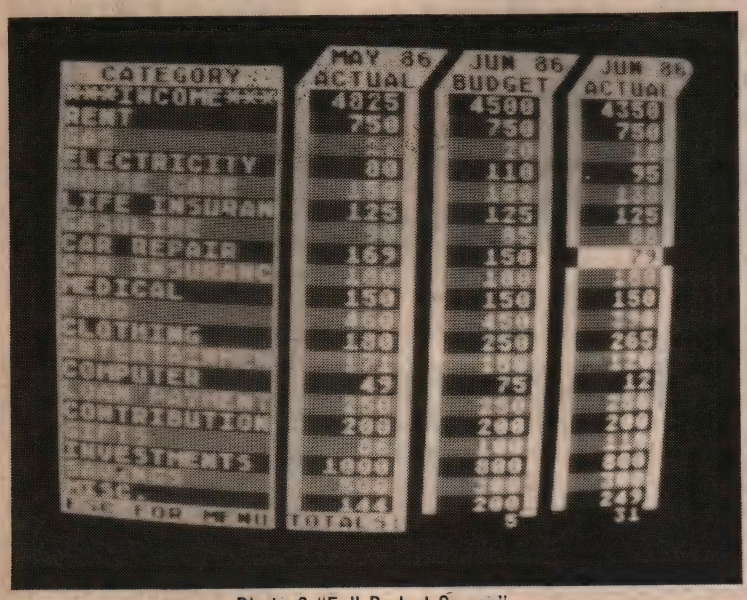


Photo 3 "Full Budget Screen"

A. Thanks for your help.

Atari 800XL Display Fix

In April's column, in response to a letter about blurred characters on the 800XL from Alan McPherron (Pittsburgh, Pennsylvania), I asked other readers experiencing the same problem to write in. Many wrote in with similar complaints, but Ricky J. Burgett (Humboldt, Nebraska) wrote in with a solution. Ricky writes: "I am writing in reply to the question on the 800XL's poor monitor performance. Both the 800 and the 130XE have separate chrominance and luminance outputs, but the 800XLs do not have an output to the chroma pin. There is a solution for this. (See **Figure 1**). The chroma output is at the emitter of Q5. You need to purchase a 200 ohm resistor and solder on one side at the junction of R67 and R68. The other side goes to pin 5 on the monitor connector. You will have to extend the 200 ohm resistor by means of an insulated wire. The Chicago Atari Users Group and Antic get credit for this solution. Several in my local users group have tried this modification and have seen a marked improvement in their monitor

PixMix Picture Diskette, Volume II

March's *PixMix* Puzzle Machine program had proved to be a very popular one, and I have been receiving numerous requests for "Volume II" of the *PixMix* picture diskette, despite the fact that I never offered a Volume II! Well, this month I'm happy to announce that Volume II is available, and best of all, it's still $5.00 (see address at end of article). Volume II consists of several specially-centered digitized pictures and other high-resolution images that can be used with the March 1985 *PixMix* program.

BudgetMate

Now for this month's feature program, *BudgetMate*. BudgetMate allows you to define up to nineteen different expense categories (and one income category) and has features that make it simple to plan your monthly budget. For example, the actual amount spent in each expense category in the previous month is displayed as you plan the next month's budget. Additionally, the planned budget of the previous month can be copied into this month's budget. A single diskette can hold a full year's worth of data. Printer output and the numeric keypad are both supported. 32K minimum memory required.

Special Monthly Diskette

In the past I have offered diskettes containing the programs listed in this column for those who did not have the time or the desire to type in programs. This month's diskette will be a little different in that it will contain a modified version of the listed *BudgetMate*. Since I have much more freedom when I design a program that will be saved directly to diskette rather than be printed in the column, I decided to create a more powerful version of *BudgetMate* for my personal use, which I will include for my readers on this month's diskette (see end of article). In addition to the original *BudgetMate* features, the enhanced version needs no initial set-up time, allows up to 20 transaction details for **each** category (including income), records dollars and cents on the transaction detail screen, and features an end-of-year summary of transaction details and expenditures. Six months worth of data can be stored on a single diskette. Two diskettes, or two sides of a diskette, can hold a full year's data. The main use of these extra features is, of course, for tax purposes, since a record of all purchases, medical expenses, contributions, business expenses, etc. can be retrieved and conveniently printed by category at any time. Therefore, those who intend to use *BudgetMate* to keep detailed income/expense records should consider this version. Supplementary instructions will be included with this monthly diskette.

Using *BudgetMate*

If you're typing in the program, be sure to use *Program Perfect*, since this is a long one. The listing appears under the *"BUDGETMATE"* heading.

When you RUN the program, the title screen soon appears (See **Photo 1**). If you have the Atari CX-85 numeric keypad, plug it into joystick port 1.

Next, you're asked to "INSERT THIS YEAR'S DATA DISKETTE OR A BLANK, FORMATTED DISK FOR A NEW YEAR." Since you do not yet have a data diskette for this year, insert a blank, formatted disk and press START. Use this diskette to store your budget data for the remainder of the year. At the beginning of a new year, you should use a new data diskette, unless you want to erase over the previous year's data.

Next, you're asked to enter the date. Type the month, day and year (i.e. 6/4/86) and press RETURN. If the month is January and you are starting a new data diskette, you are asked to insert the previous year's diskette so that *BudgetMate* can load in the data from December of that year. You won't have to do this until next year.

Once the date has been entered, the appropriate files are opened or created on the data diskette and the budget screen is displayed. On the left-hand side of the screen is a menu of the commands (see **Photo 2**). Press ESC and the full budget screen will be displayed, with the names of any categories you have entered (see **Photo 3**). You can toggle between the command menu and the full screen at any

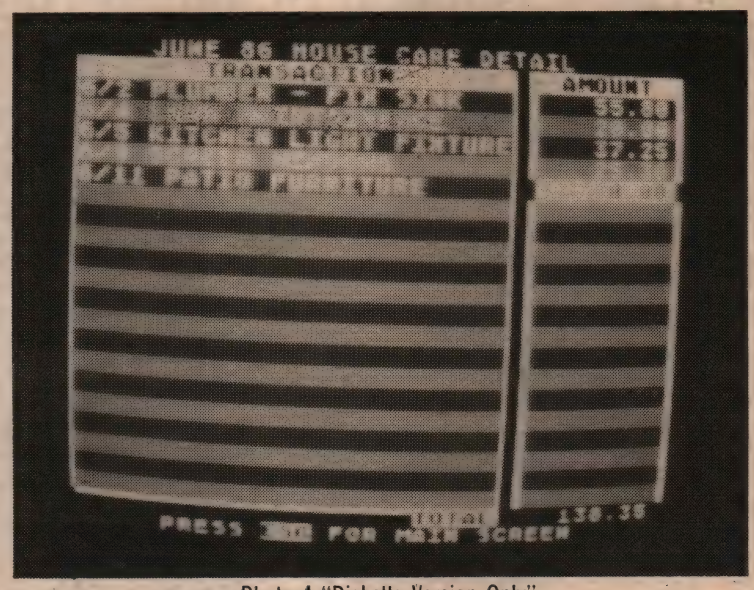


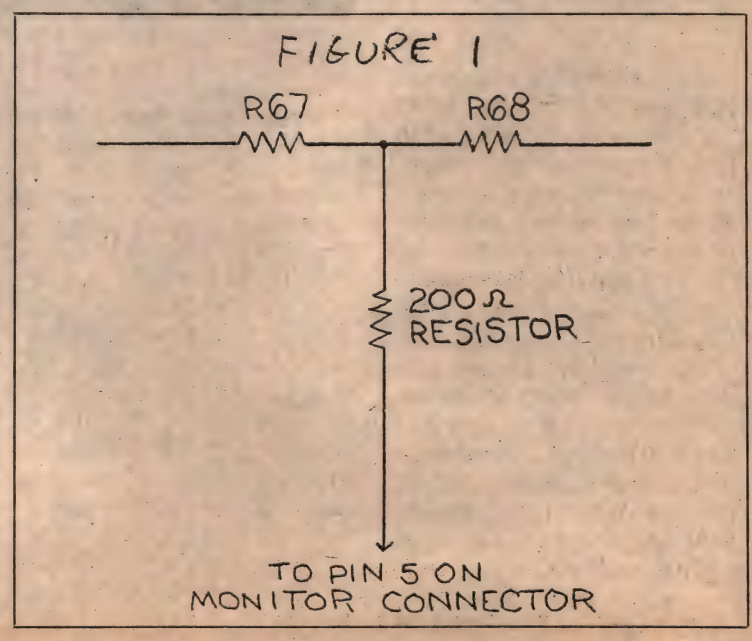
Photo 4 "Diskette Version Only"

time by pressing the ESC key.

The elongated cursor can be moved around the screen by using the cursor-control arrow keys. You do **not** need to hold down the control key to move the cursor. On the numeric keypad, the four keys on the left-side of the keypad will move the cursor up, down, left and right, respectively (from top to bottom). Changing or adding items to the screen is easy. Simply position the cursor over the data that you want to change, or over the position to which you want to add data. Then use the keyboard or the numeric keypad to enter the information. *BudgetMate* will automatically switch to its input mode and will display your entry on the screen when you press RETURN. To enter a negative number, press RETURN first and then the negative sign, otherwise pressing the negative sign would move the cursor up (since it is the same key as the up arrow).

The first thing you'll want to do is enter the categories. The same category data is used for each month's budget data, so you should avoid changing categories in which you have already entered data in the months before. You can and should, however, **add** categories as you discover that you need more. Move the cursor over to the category column and position it on top of the next empty "block," type the name of the category you want to place there and press RETURN. You can add more categories or change any category in the same manner. You should not change the ***INCOME*** category to an expense category, since it is treated differently by the program (the INCOME category is assigned a positive value in-

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TANDY COMPUTERS

Tandy Model 600
A Business User's Dream

by Cheryl Peterson

My first impressions of the Tandy 600 were formed as I toyed with it at the Tandy/Radio Shack booth at Comdex, 1985. It was an attractively designed little box with one of those LCD screens that I just hate and a 3.5" disk drive. As I played with the display, I found that the flip-up screen didn't have graduated steps for positioning like some other LCD computers. It could be set anywhere along an arc that gave it the best chance of using the available light. Of course, Tandy's booth was planned to put the Model 600 in its "best light." But who can blame them for that?

Knowing that I'd be receiving a review unit in a few weeks, I didn't devote much time to investgatinging it there. Instead I asked the design engineer a few questions and headed out in pursuit of oddities.

When the review unit arrived, I was pleasantly surprised to find that it already contained one of the 96K add-on memory modules. The basic unit comes with the 32K of RAM and a bunch of applications in ROM. With the built-in disk drive, the extra memory is not as critical as it would be if there were nowhere else to store files but in memory. (At $399.95, the memory upgrade is a bit steeply priced. But it sure is nice to have.)

After using the unit with the extra memory, I would have a hard time trying to adjust to the limited 32K. But I think someone already used to 32K would be quite comfortable with the basic unit. Since I have an old 64K computer that I've never expanded, having a portable with almost 128K of free memory sitting in my lap was more than a bit strange. I must say that it was a nice feeling though.

Software Built-in

One reason for the large amount of free space is that all the applications programs are in ROM. Plan, Word, File, Telcom and Calendar are all available through a Systems Manager that controls the applcations. The applications manager is a menu driven DOS-shell that moves you between the applications packages and controls file transfers and disk activities.

Since it doesn't run MSDOS or any other popular operating system, you are limited to running those programs that exist in ROM. A switch-in BASIC ROM is available for $129.95. The Plan program is lost when the BASIC chip is switched in. If you are happy with the way these function, you will most likely be pleased to own the Model 600. I found the programs to be adequate. The only one that I found disappointing was Word and that is only because I am a writer and expect a lot from even a "portable" work processor.

All of the programs use a similar command structure making it easy to learn the basic commands. Most of the commands exist in a menu that is called up by hitting a function key. Once the menu appears options are chosen by pressing the first letter of the desired function. In some cases a few more keystrokes are required to define parameters, but all in all I found the similarities in command structure reassuring.

The programs in the Model 600 are planned with the business user in mind. In reading through the documentation, this becomes painfully obvious. The sample for Word is a one paragraph memo. The sample for Plan is a Quarterly profit statement. The Calendar sample lists appointments like "lunch with client," "status meeting," and "draft contract for Jones account."

Plan is our old friend Multiplan in a new guise. The main menu has been reduced in size from that found in other implimentations. This was necessitated by the smaller screen on the Model 601. Two lines of commands would have cramped the 600's data area down to only about 5 lines.

The documentation for Plan is the most extensive of all the sections. This is not surprising since Plan is the most complicated of the programs in ROM. For those who need a "traveling spreadsheet" program, Plan will almost certainly meet their needs.

File is a simple, effective database manager. It most resembles a spreadsheet of text information. Columns and rows are used to define entries. Each row contains one record, columns are headed by topics describing their contents.



Tandy 600 Portable Computer

File is used to create the Telcom's phone book. When creating the phone book file, a single typographical error (adding an "s" where it isn't expected, for instance) caused the phone book to be unacceptable to Telcom. The documentation doesn't bother to tell you that spelling counts.

Telcom is used to transfer files to remote terminals. As a communications package, I found it difficult to adjust to. Part of this was due to having to create a phone book file using another program. Telcom is the only program of the bunch that looked like it belonged in "techie" hands. Besides controlling the modem, it's used to determine the output speed for the RS232 port. Baud rates go as high as 19200 in varying steps.

With the usual modem parameters, Telcom makes this a good system for commuicating. XMODEM and XON/XOFF protocols are available. Buffered data is supposed to be saved to a file, but when I went looking for the file, it was empty.

From inside any application a four-function calculator can be called up to do simple addition, subtraction, multiplication and division. A scrap file is used to store data to be transferred between applications. The scrap can also be used as a notepad.

Although the programs are supposedly "integrated," data created with any one of the programs will need to be modified slightly to work with others. Filenames include a three-letter extended that usually indicates which of the programs the file is meant to be used with.

Taking addresses from the File application and inserting them into letters is a major undertaking. The addresses must be written out to a new file and then inserted individually into the letters.

Hardware

At under 10 pounds and conveniently sized to fit in a briefcase, the handleless unit technically qualifies as a portable. Without a handle though, "lugging" it around isn't a joy.

While it has "everything" you need, it won't communicate with the outside world without added extras. Plan to get two cables, one for the modem and one for a printer, at the very least. If you plan to use the RS232 serial port, it needs a cable. The cables cost about $20 at a local Radio Shack store.

The power converter takes 14 hours to fully recharge the battery. Disk access drains the battery quickly. It took less than 10 file transfers to drain the battery during one session.

With 32K of memory avilable for storage, disk access is an attractive feature. Overusing it while disconnected from a power source is a temptation, but a red warning light services as a reminder. It lights during disk access when the battery is low and when the battery is almost exhausted it stays lit. With a 96K add-on memory module, the memory space is less restricted and accessing the drive can be reserved for saving backup copies of work.

The 3.5" disk drive is very quiet and quick. Transferring data from memory to the disk drive is accomplished with a copy command. The disk drive is assigned as drive A: Very easy.

The built-in autoanswer /autodial modem dial with pulse or tones. A switch selects either direct connect or acoustic coupled modems. A software switch is used to reflet hardwiring between two computers. Third party modems may be attached via the RS232 port.

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CoCo Column

by Michael Wafkowski

Telewriter Plus — An Unabashed Plug

For any CoCo user who does more than the most casual writing with Telewriter-64 I urge you to run not walk to your telephone and order a copy of Telepatch to enhance your word processor.

Telepatch creates a new version of the program that adds true block moves, auto key repeat, key click, visible carriage returns, choice of disk I/O residing in memory or not, and single keystroke switching between ASCII and Binary modes. Also added to Telewriter are a choice between the standard insert text mode and a new overstrike mode. Cursor movement with the patch is faster and smoother. Faster typists will be pleased with a type ahead buffer that doesn't drop characters like Telewriter is known to do.

Creating the new version of Telewriter is simple. You run a program called "Patchr" and just follow the prompts. Any command that might write to or affect an existing file is preceeded by the prompt "Are you sure?"

All of the programs printing and formatting parameters are easily changed and resaved in a new and very well documented version of the Telewriter basic loader. Changing your startup parameters is extremely easy. There is even a utility included to let you print your text files to disk, all set up and formatted for printing.

The utility costs $19.95 and can be ordered through Tandy Express Order Software or from Spectrum Products and several other CoCo dealers. I consider it the best 20 bucks I've spent on CoCo software in some time.

Deskmate

The new Deskmate package from Tandy is for the beginning or casual user a perfectly adequate general purpose "integrated" package of the most needed applications, word processing, telecommunications, database, and spreadsheet.

The graphic user interface is well done, ala the Macintosh, and I found that the program worked very smoothly with a Color Mouse. One can also use a joystick or the keyboard to access the pull-down menus. The display screen can be set up for either a dark-on-light, or light-on-dark screen.

The writing portion, called Text has a 32-column screen like the CoCo's original screen, only in very readable hi-res. I personally find the amount of text visible on the screen is inadequate. The printing driver of Deskmate contains only minimal flexibility for printing and formatting. Printing can be done at the standard 600 baud or the only slightly faster 1200 baud rate.

Ledger, the spreadsheet, can contain up to 99 columns by 99 rows. It offers a fairly powerful set of formulas and math functions, enough for the average home user, but nothing like the power in "Dynacalc."

Calendar is a desktop appointment organizer which would be very useful if the rest of the applications were powerful enough so that you only had to boot up Deskmate in the morning and use it for all your day's work. A four function on-screen calculator is also available throughout all the program modules.

Index Cards is a simple database program using a graphic replications of index files which are opened or closed with a joystick, mouse or keyboard. As a simple file manager it is adequate, but it is weak in searching and report creating power.

Telecom is the packages strongest entry. It requires the use of the Multi-Pak and an RS-232 cartridge, therefore adding to the expense of the system. This telecommunications module works very well at 1200 baud, unlike CoCo software using the bit-banging serial port.

Paint is a CoCo Max-like graphics drawing program using similar pull down menus. The program is fairly well done but not anywhere near as user friendly, or powerful as CoCo Max.

The CoCo "Power User," however, will find this OS-9 program lacking both in power and speed. Those who have used the most powerful CoCo applications, Telewriter-64, Dynacalc and Pro-Color-File (my own big three) will not be satisfied with the features offered in the $99.95 program from Tandy. The program does not meet the high level of performance I've come to expect from the most productive Color Computer software.

Tandy has recently had Deskmate on sale with other CoCo software for half price. At $49.95 the program is worth the money. For $99.95 you'd do much better to add a few dollars and purchase the three programs I mentioned earlier. I would advise Tandy to bundle Deskmate with a full blown CoCo system as they do with all their other computers. It would help CoCo sales.

Hardware Mod — Reverse Screen Mod

For those of you who have become interested in working with hardware I present a relatively simple hardware modification to reverse your CoCo's screen to give a green display on a black background. I like the modification so much I didn't even bother to install a switch to return to the normal screen. The mod has no effect on any of CoCo's graphic functions.

Warning

Before going ahead with this modification we must warn you that this modification will *void your warranty*.

More importantly its easy to kill your machine if great care is not taken.

Neither *Computer Shopper* or the authors are responsible for any damage you may do. If you don't have extensive soldering experience don't try to do this modification.

Tools you'll need are a soldering iron (no more than 25 watts), a small screwdriver or chip puller, a small length of wire, and some electrical solder (no resin core solder).

The modification is more difficult on the CoCo II than it is on the old grey CoCo because the chips you have to work on are soldered into the board. If you feel unsure about unsoldering a couple of chips you should not try the modification, or have someone experienced with soldering on hand when you do the work.

For the CoCo II you'll need a desoldering device to remove the two chips from the motherboard and two sockets to reinstall the chips.

Now take a deep breath.... and

1) Locate and remove IC chips U29 (74LS02) and U7 (MC6847). Handle with care as chips are sensitive to static. With the CoCo II you'll have to work from the underside of the motherboard to desolder the chips.

2) Bend pins 1,2,3 on U29 straight up in the air. Bend pin

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New Firmware Chip For Tandy And NEC Portable Laptop Computers

Traveling Software Inc., a Seattle-based software firm specializing in software for portable laptop computers, has started shipping a powerful new multi-application product, the Ultimate ROM II, with several programs on a single plug-in ROM chip.

For word processing and text formatting the Ultimate ROM II offers T-Word, a new system that actually improves on features of desktop word processors. For database management, there is a new and faster version of T-base, an acclaimed system that puts the power of dBASE in a laptop. And for outline processing here is an improved version of the popular IDEA!, which provides the versatility of desktop programs like ThinkTank.

Also on the Ultimate ROM II is ROM-View 80 which allows the user to enter and view information in lines up to 80 characters long instead of the usual 40. Three utilities in one, ROM-View 80 operates in the TEXT, TELCOM, and BASIC programs built into the Tandy 100 and the NEC PC-8201. ROM-View 80 is not available for the Tandy 200.

With ROM-View 80 the user sees 60 columns at once and can scroll the screen to see a total of 80 columns. The characters are condensed yet easily readable, with full upper and lowercase and descenders.

"T-Word is a complete word processing system, the fastest and easiest to use that has ever been developed for the Tandy Models 100/200 or the NEC PC-8201," says Mark Eppley, president of Traveling Software. "We have more than doubled the word processing power of these computers with features such as full search and replace, an insert/overwrite toggle, word/character count, and complete text formatting and merge capabilities."

With T-Word the user can see a document plotted on the screen and determine page and line breaks without having to print the document first. These preview options are not found in desktop word processors, Eppley noted.

T-Word allows editing in lines up to 80 columns long and, through a small utility program, the chain printing of files from the new 3 1/2 inch Tandy Portable Disk Drive. The Ultimate ROM II also has a "gateway" built-in for support of the $199 battery-operated disk drive. The Ultimate RoM II can load another Traveling Software product, TS-DOS, by simply pressing one key.

In this improved version, T-base includes several new features like advanced math calculations, conditional branching, and full data compatibility with dBASE II and III and R:base 5000. Eppley said that T-base is now noticeably faster than previous versions.

IDEA! now includes a preview mode that allows for viewing multiple levels of an outline at once with several scrolling options. It also includes a "template" option, by which forms can be set up and "remembered" for fast copying and moving. The new IDEA!, too, operates significantly faster than before.

For converting MS-DOS ThinkTank files to IDEA! files and vice versa, Traveling Software is offering a separate conversion utility for $19.95. This utility reduces the overhead in ThinkTank files when converted to IDEA! files and is available on 5 1/4 inch disk for the IBM PC and compatible computers.

The Ultimate ROM II is available from Radio Shack stores via the Express Order Software program, catalog number 90-0409 for the Model 100 and 90-0410 for the Tandy 200. It is also available from independent computer and software dealers nationwide or direct from Traveling software.

For additional information contact Traveling Software, Inc., 11050 Fifth Avenue NE, Seattle, WA 98125; (206) 367-8090.

Mention that you read about it in *Computer Shopper*. ●

SANYO

The Silver Box

by Richard Fujita

The Incompatibility

As most of you know already, the Sanyo color board, VB550, does not give you 100% software compatibility with the IBM PC unless the interface with the hardware is done through the DOS. The most significant Sanyo departure from the IBM PC computer exists in the disk controller section of the hardware. The difference between the IBM video display system and the Sanyo can be overcome by the use of the VB550 video board.

Unfortunately lots of good and popular software does not fall into the compatible category, since most of these software systems use some type of copy protection and this is where the non-compatibility sets in. As you know, copy protection is done in several ways such as:

1. Use of track 40 and/or track 41, both of which cannot be accessed through the DOS.

2. Hiding some identification code sequence(s) in one or two of the sectors marked as 'bad' by the DOS.

3. Creation of artificially damaged sectors such as: too short, too long or with a bad CRC (the Cyclic Redundancy Check) value.

4. Reading the erased file in the predetermined tracks and sectors (Flight Simulator uses this technique with its own simple DOS but uses the BIOS without modifying it).

5. Use of missing or too many sectors of varying lengths which are impossible to be read by the DOS, etc. Most of these methods, except type 4, require direct interface with the disk control hardware and here the incompatibility shows up.

If you use the VB550, as many of us serious users do, all IBM software should run in the Sanyo, if, and this is a big *if*, the software does not alter the BIOS and/or the Vector Table, or expect the hardware configuration to be the same as the IBM PC in manipulating controllers directly. The disk controllers require different codes and sequences (it is 765 in IBM PC, 8877/1793 in the Sanyo). Also the port address values are different for the above and the 8259 Interrupt Controller, as well as all other devices and switches.

The IBM PC uses numerous ports to read control settings and status to detect setting of available RAMs, roms and ports in expansion boards, while the Sanyo lacks these ports due to the machine design policy. The Sanyo machine has been designed as an economical IBM PC "alternative," but not as "compatible," and without plans for a significant expansion after initial sale.

Apparently Sanyo originally planned to give users an external, expansion capability through the use of a single row of DIL (Dual In Line) bus expansion pins and an opening for a 62 line flat cable, clearly marked as "EXTERNAL."

The "Missing Link" From Tampa Bay Digital

This board is *probably* the most desirable board after the VB550, the so called Sanyo color board, or, "123" board. The reason why I said "probably" is because the board I received for evaluation is not working yet, for either one of the following reasons: 1. I am too stupid to use this good board, or 2. this board has taken sudden ill and needs some care. Yes, it could be both, that is, I am too stupid to use this good board and the board has also taken ill.

The Sanyo 123 Color Board has an extra Interrupt Controller and a Real Time Clock on board. The former is useful as the Instructions suggest when you have other boards connected to it. The latter is a real nice convenience. It adds an extra consistency to your files with accurate date stamps, just like our other two computers, the Clumsy Clone and the Sharp Portable with a Siamese five and quarter inch drive.

The 123 board can give you 768K maximum Ram. Your MSDOS will be able to use 640K anyway and with this much RAM you will be using a comfortable size of RAM disk. I could not try the modified BIOS using the Tampa Bay's MLINSTAL.COM in my Silver Box with more than 512K RAM. As I explained before, the VB512 has failed when the two rows of 256K RAMs were installed. The Missing Link is feeling ill also.

The computer did not boot when the RAM cable is connected, with or without any of the two Sanyo color boards. When I switched the option to accept the original Sanyo display system, it booted up, loading the BIOS and the DOS files, indicating the progress by the sign-on messages of these programs, then the computer hangs or starts to beat the bushes.

When I pulled off the RAM connection which is plugged into one of the RAM sockets on the main board, my Silver Box booted successfully but of course with only 256K RAM. At this stage, I thought I should be able to red the Real Time Clock. This booting was done with the ordinary Sanyo MSDOS 2.11. I modified the BIOS as described in the Instruction and copied the CONFIG.SYS and related files onto this disk. With this disk I tried to boot it about eight times without success. It hangs every time when it starts to install the clock driver, the MLCLK.SYS.

After a quick look through the codes, I found some sequences of codes which input and output to the port address FE40-FE43H, the ports for the clock chip registers. I tried to input or output to these ports from Debug. Sure enough, it hangs. Now it is apparent that the clock driver hangs the computer at this point. If this happens, you may not see the log-on message of the Sanyo COMMAND.COM, the words "Command 2.11" displayed on the screen during the booting process, because the computer stops at the stage of installing user's drivers prior to loading the COMMAND.COM, the MSDOS command processor (an interpretor).

As to the question of disrupting RAM, I suspected a bad LSTTL, Lowpower Schottky Transistor-Transistor Logic. The Schottky diodes are used in Schottky TTL circuits in which the diodes are used as the speed-up diodes connected to the base of transistors used in the logic. The speed-up diode, the high-speed Schottky diode, is similar in construction to the ubiquitous selenium rectifiers in your battery charger but works in the micro-wave region of frequency and sponges up the excess current produced by the base charge every time the transistor turns-off.

Trouble Shooting TTL

Before pulling out the triggersope to check the clock line, I tested the LSTTL ICs used on the board. I put two loose pins into the connector socket of the Missing Link board to provide 5V power to the board, then I measured voltages on all the pins.

Unless it is operating at a clock frequency or pulsed constantly as a line in a data-bus, or in the address-bus, the voltage reading of TTL circuits should be less than 0.5V for the

continued on page 183

Joysticking Your Sanyo

by Francis Miller

If you're like me, you've often dreamed of having a joystick on your Sanyo 55x. After all, there's that empty sixteen pin socket on the mother board; right? And something should be plugged in there. Right? It doesn't look right sitting there bare. And then there are all those good games you could write. If only you had that joystick.

But when you consider the cost of a good joystick, around twenty dollars, you have to pause and reconsider. Twenty or thirty bucks for a decent joystick, and you don't know if you really need one? If you're like me, about this time you're thinking maybe you can spend that money for something else.

But I kept seeing ads for the "barebones joystick." Jameco Electronics, which advertises in this magazine, sells this type of joystick for less than five dollars. Basically, it's a joystick without the frills--without the case, the wires, the know, etc. Most electronic suppliers carry them. Why not, I said to myself, buy the barebones model and try it on the Sanyo. If I like it I could always buy one of the expensive jobs.

That's what I invite you to do, also. I'll show you how to wire the joystick, how to connect the stick to the Sanyo computer, and offer a little BASIC program, besides. With the program you'll see, like I did, all the possibilities of having a joystick. Maybe you'll decide to invest in an expensive model.

Let me begin, however, with a warning. Any time you open your computer, you are running a risk. You are also VOIDing YOUR WARRANTY. And you could destroy your CPU board by plugging the wrong wire into the wrong gizmo. Neither *Computer Shopper* nor the author are responsible for any damage that you do. Read over this entire article before you decide to start. This project is meant for those with experience in soldering. Don't start it unless you have the greatest confidence in your ability.

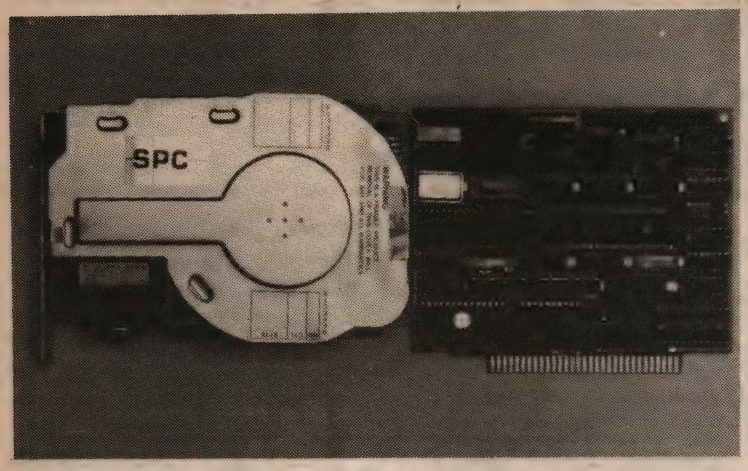
You will need a small soldering iron (30 watt is okay), rosin-core solder, and a pair of needle-nose pliers. A good logic probe would be helpful, though not necessary. You should, also, have an ohmmeter handy. The parts you'll require are the barebones joystick, four miniature normally-open contact button-switches, a sixteen-pin DIP socket and jumper, and a length of cable, five or six feet, with eight conductors. The length of the cable depends on how far from your computer you want to use the joystick.

As I have said before, you can buy this joystick from electronic suppliers that advertise in this magazine. Jameco lists a 150K model. Get one with 100K or 150K potentiometers.

By the way, don't buy the joysticks you find in discount

continued on page 181

An Easy Upgrade To Real Power On The Sanyo 550 Series Computer



Winchester Drive for Sanyo

For those serious 550/555 users who are flanked by piles of floppy disks and need to speed up their system, a simple and economical solution is available...a hard disk,otherwise known as a Winchester. Unfortunately, because of the electrical and software incompatibility of the Sanyo 550 with the PC interface standards defined by IBM, vendors are forced to charge higher prices than those for similar offerings for the PC. Consequently, the question arises, "Should I invest in a "more compatible" PC and save on the hard disk expense, and let the kids have the 550?, or "Upgrade the 550 as is?" Here are several options that may make the decision easier.

Depending on the existing configuration, the simplest system to install is an add-on external drive complete with an external chassis, power supply, fan, controller, and disk drive. These systems can range from 10 to 120 Megabytes of formatted storage with accompanying prices of $695 to $4995 and up. Even the smallest system has over 30 times the capacity of a 360 Kilobyte floppy and is available in either a fixed- or removable-media drive. Winchesters typically access and transfer data to memory 10 times faster than a floppy, improving system throughput considerably. The larger file size also enables the user to take better advantage of the tree-structured method of separating files using MSDOS.

Installation consists of removing the top cover on the 550/555 and connecting a small adapter card to the 62-pin connector on the left side of the mother board. It's easier than installing a video card! A thin 34-wire ribbon cable is then routed thru the rear cabinet to the disk drive enclosure, which may house one or more drives. For systems which already use a video card, an additional "T" adapter is required which cost $90. For users who already own a "bare" disk drive acquired independently, the interface hardware and software is available for only $595 and is refered to as a $Saver Kit. Of the variety of drives available in the external configuration, the most popular is the 10 Megabyte version, similar to those used in the PC/XT. However, a much better cost-per-megabyte is available with the 22 or 34 Megabyte systems (formatted capacity).

For a little less money and a small amount of work, the hard disk may also be installed internally in the "B" drive slot in the 550 cabinet. This is very attractive for those with limited desk space. An additional 512 Kb. Memory Expansion is available with this controller card, providing the maximum storage addressable by the 550's operating system. The additional memory also means faster program execution and data transfer, and access to more sophisticated software needing higher capacities than the 256 Kb. currently available. Unfortunately, this controller cannot be used concurrently with the video board because of the space restriction inside the 550. The controller derives its power directly from the motherboard and connects to the disk with a pair of cables. It should be noted at this point that an external disk cabinet could be used with this controller also, thus taking advantage of the 512 Kb. increased memory capacity.

On most systems with an internal drive, a slight modification to the power supply must be made which can be done by a dealer for $25 to $50, although the two resistors required are provided by the hard drive vendor. If desired, a modified power supply will be shipped with the drive upgrade for $50. The original power supply must then be returned. The p.s. upgrade has been discussed in a previous issue of *Computer Shopper*. The upgrade is quite simple requiring the replacement of two resistors on the supply (provided by SPC). Also provided is a replacement fan which has a higher capacity than the factory model...only two screws need removing to swap the fans. This will ensure a cool operating environment for the internal electronics, including the mechanics of both the floppy and hard disk drives.

Internal drives currently supported include 10, 22, and 34 Mb. fixed disks and both 5 and 10 Mb. removable cartridge drives. Extra cartridges for the removable Winchesters cost between $100 and $125...a very low price to pay for an additional 5 or 10 Megabytes of high-speed, random access storage.

The question still arises, "What do I do with my hard disk if I move up to a more powerful PC compatible, such as the Sanyo 880?" Fortunately, SPC supports all MSDOS (and CP/M) computers, so that when the time comes to upgrade, your hard disk system will *not* be obsolete, and the same upgrade can be used with the new computer. In some cases, a no-charge controller swap must be made. It matters not whether the drive was mounted internally or externally, your original investment will continue to produce dividends of speed and convenience, and that's what computing is all about.

For additional information contact Systems Peripherals Consultants, 9747 Business Park Avenue, San Diego, CA 92131; (619) 693-8611.

Mention that you read about it in *Computer Shopper*. ●

Software: Appointment Calendar And Type Right For Sanyo

by Dr. Michael Ecker

This month, in addition to DDR's Math Tutor I, I also took a look at some other Sanyo 55x products, including two from MichTron. One of these could be considered educational, and the other a utility.

Type Right

Are you curious about your typing speed? Accuracy?

Perhaps you're a new typist still hunting and pecking at your Sanyo keyboard, then?

In either case, MichTron's Type Right (note the word play here), written by Ken Olson, can help. Although I personally was skeptical about how helpful such a program could be, I soon got into the program and found myself racing to complete the exercises as carefully and as quickly as possible. With instantaneous feedback, Type Right will help your typing in both these regards.

Of course, bear in mind, as you learn, that the Sanyo keyboard has that awful peculiarity of the <> key to the left of the Z key, right where you would expect the shift key to be. When you suddenly shift to a typewriter or another computer, you will have to "debrief" yourself to re-acclimate yourself to the way a keyboard ought to be. This, of course, is no criticism of MichTron, Olson, or Type Right.

In actual use, you copy the files to a formatted disk. (You may wish to create an autoexec.bat file on a system disk to load TR automatically if you're going to use it a lot.) From DOS, type TR, and the machine language program loads quickly.

The one thing you may find disconcerting (I did!), is that there are two spelling errors--typos, to be precise--right on the opening "page!" This is one of MichTron's biggest areas of sloppiness. I don't understand why it has such problems, and there is no excuse for it in a typing program! Come on MichTron; is this some sort of test or joke?

Other than this quibble from a finicky reviewer, I found only commendable things. The disk comes in the usual MichTron box with a few pages with punched holes so you can add them to your Sanyo manual. The instruc-

continued on page 195

Math Tutor I

by Dr. Michael Ecker

About a year and a half ago, David Allen Roberts did two interesting things. First, he bought himself a Sanyo 550/555 series computer. Second, he decided he would use it to help his elementary school-aged son, Danny, learn arithmetic more proficiently. He would do this by writing a program for the Sanyo. That program would have bells and whistles, and otherwise would make learning a joy, particularly by exploiting the great graphics of the 550/555.

Now, a year and a half--and an impressive 1,300 plus lines of Basic code--later, Mr. Roberts has completed his implementation. He has prepared a highly professional version of the program. In fact, he contacted us here at the *Computer Shopper* for help in getting the word out as to the availability of the program because a major Sanyo software publisher backed out of the Sanyo market, leaving him high and dry. Thus, he now markets the product himself and via others. His own company is DDR Software Associates. I asked Mr. Roberts about the initials. "They stand for David and Danny Roberts" was his reply.

Being involved with Sanyo software, I frequently am asked to locate a package for newcomers. With the Telephone Auction heavily promoting Sanyo 550 sales (closeouts), lots of newcomers come looking for such packages as a math tutor. Would this one be as good as DDR claimed?

Just A Tutor But A Very Good One

I reviewed the Sanyo program, although I also received the recently created IBM/generic MSDOS version as well. I'll stick to the Sanyo version here, but let me point out the interesting observation that this product is a Sanyo product "ported over" to the IBM world, not vice-versa as is usually the case. So, if you have an IBM or compatible, continue to read on. Just remember to specify your ma-

continued on page 180

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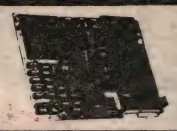
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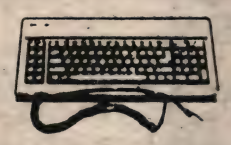
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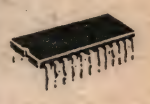
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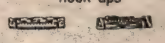
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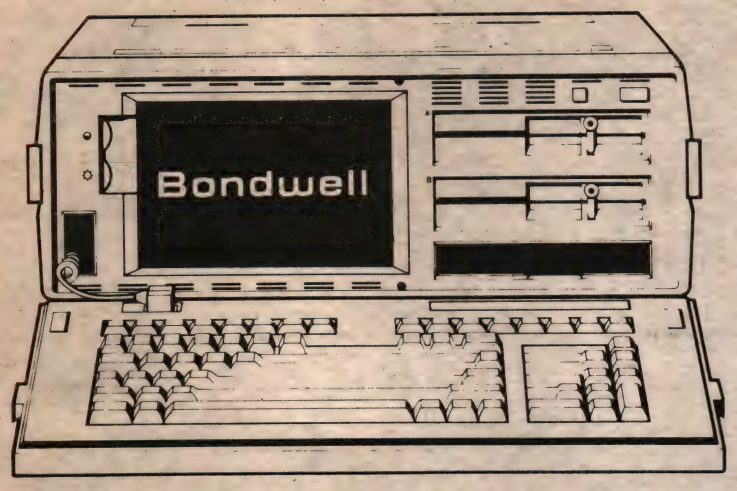
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TEXAS INSTRUMENTS

TI Forum

by Ron Albright and Jonathan Zittrain

Super Space From DataBioTics

Interested in creating your own cartridges from assembly language programs? "Super Space," a module available from DataBioTics of Palos Verdes Estates, California, will let you do just that.

Super Space is a souped-up Editor/Assembler module, containing an additional 8K of CMOS RAM that can be accessed by assembly language programs or used to store such programs. A lithium battery within the module will allow a program to remain in memory for at least two years if the module is properly cared for. Of course, it is not difficult to erase an old program and use a new one in the module as the user desires.

The RAM memory in Super Space occupies address space from >6000 to >7FFF, similar to where a cartridge would reside in the computer's hexadecimal memory system (many regular assembly language programs reside starting at >A000 in memory). The extra memory provided by the module can be used by assembly language programmers for extra buffer space, but the most prominent and easy-to-use feature is to create a pseudo-cartridge with that memory.

With little understanding of assembly language required, one can add a "GROM header" to an existing assembly language program, making the program appear on the main startup screen when the module is inserted. Since the module also contains Editor/Assembler, a typical startup screen would display 1 for TI BASIC, 2 for Editor/Assembler, and 3-7 for the program(s) of your choice. With only 8K to work with, probably only one extra program at a time will fit, though.

If the assembly language program to be added to the module contains certain assembly language statements (VSBW, VMBW, VSBR, VMBR, VWTR, KSCAN, GPLLNK, and DSRLNK) a file called "UTILITIES" (found on a disk accompanying the Super Space module) must be included when the program is assembled. These utilities are normally loaded when a CALL INIT is issued from BASIC or option 3 ("Load and run") is selected from the Editor/Assembler main menu, but they will not be automatically accessed if your program is included as a pseudo-cartridge, from options 3-7 on the main TI menu.

To load the programs into the module, the user need only use the module's built-in Editor/Assembler and load the program normally. If the GROM header were included correctly, the program will appear on the main TI menu when the menu is next accessed. To simply keep the program in memory without the GROM header, an AORG >6000 statement is needed in the source code to force the program to load into the module.

In actually working with Super Space I found few problems. The module seemed to be very sensitive to removal and reinsertion to the computer, whether the computer was on or off. The manual warns that turning the console on or off too quickly or not touching a metal object before handling the cartridge (to discharge any accumulated static electricity) could damage the RAM contents of the module, and this did seem to be the case. The user should make sure that a safe copy of any assembly program in the module is also stored on disk, just in case it becomes accidentally garbled or erased.

Documentation for the Super Space module was complete and easy to understand. A spare parts list is given for the kit form and the disk accompanying Super Space includes several demonstration programs, the necessary GROM headers for placing assembly programs into the main TI menu list, a MENU program written in BASIC that allows a power-up menu to be created that will load the given programs from disk, and the UTILITIES file that I mentioned before. Also included is a program called "CVAC" which allows ROM-only (most of the later TI modules are NOT ROM-only) modules to be saved to disk and reloaded for use with Super Space. The saved cartridges still require Super Space to run, a concept similar to Millers Graphics more powerful (and more expensive) GRAM KRACKER (tm).

Super Space is patterned after (and generally interchangable with) the "Super Cart" module from Ron Gries, David Romer, and John Clulow of the 99'ers Northwest Ohio Users Group. The construction of a Super Cart requires a previously-owned Editor/Assember module, and is more of the homebrew variety than Super Space. A game module must also be dismantled for Super Cart in order to get a usable circuit board for construction of the super Cart and inclusion of the Editor/Assembler GROM. The building of both kits requires soldering of delicate ICs, so building from kit form should be attempted only with prior kit-building experience.

Although the Super Space module comes with the Editor/Assembler GROM inside, neither the Editor/Assembler disk nor E/A manual is included. The E/A disk includes the actual editor and assembler, so for heavy E/A use that disk will be needed from another source, possibly TI itself.

Some programs already modified for use with Super Space/Cart include Edgar Dohmann's SUPERBUG II (an improved version of TI's public domain SUPERBUG, $10 for diskette and manual), a disk of software from David Romer (213 Earl Street, Walbridge, OH 43464) available for $6, and Paul Charlton's FASTTERM, in a compressed version. Dohmann also designed the Super Space module. Dohmann can be contacted at Route 5, Box 84, Alvin, TX

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Using Call Key

by Glenn Davis

Although everybody uses a key-scan now and then, many people do not realize there are some pretty handy tricks that can be used to make the rest of their programming easier. CALL KEY, as implemented on the TI/4A, has six modes to operate in: 0-5. As described in the *User's Reference Guide* the modes are as follows:

0--Scans in the same mode scanned immediately before it.

1--Scans left side of the keyboard.

2--Scans right side of the keyboard.

3--TI 99/4 mode. This has important applications! TI-Writer uses this mode in the text formatter.

4--Pascal mode. This is true 7-bit ASCII and any code 0-127 can be generated off the keyboard (and more than 30 others). The 99/4 did not have this mode.

5--TI BASIC standard mode. This is the mode used by BASIC, and if CALL KEY(0, K,S) is performed initially, it behaves like a CALL KEY(5, K,S).

Modes 1 and 2 are used the same way you would use the joysticks via CALL JOYST. The key-codes for modes 1 and 2 generate codes that are in the *User's Reference Guide* on page III-4. Two people can then operate games on opposite sides of the keyboard without interfering with each other. But, since people use modes 1 and 2 for games already, I won't bother with an in-depth discussion.

Mode 3 acted differently on the 99/4. It behaved like a CALL KEY(5,K,S) on the 99/4A. Several character codes do not exist in this mode, however: ASCII 0, 16-31, and 96 and greater are not available in mode 3. ASCII 96 is " ` ", the accent grave. The codes 16-31 are normally ASCII control characters.

Mode 3 has several applications. One of which is accepting a single character from the keyboard, regardless of the case. In this manner, a "Y" (versus a "y") will always be detected when the "Y" key is pressed, whether or not the ALPHA-LOCK is depressed. Many programmers assume (by coding the program in a certain way) that the ALPHA-LOCK is not depressed or prompt the user that it must not be depressed (or vice-versa). Mode 3 allows you to get around that. By specifying CALL KEY(3,K,S) the 99/4A will accept only upper-case, so when the keyboard is scanned, it won't matter if the ALPHA-LOCK is up or down. Amazingly, this also works on INPUT, LINPUT and ACCEPT statements too! A short program can illustrate this.

```
100 CALL KEY(3,K,S)
110 CALL CLEAR
120 INPUT "SEE! ONLY UPPER-CASE
    NO lower-case":A$
130 GOTO 120
```

Try the ALPHA-LOCK in both positions and you'll see that it is impossible to get lower-case on the screen by typing off the keyboard! In either case, the tilde ("~") and other special characters cannot be entered. Try inserting LINPUT and ACCEPT in place of INPUT if you have TI Extended BASIC.

Another application for mode 3 appears when dealing with files on the disk system and printer. Programs are written to prompt for "device.filename". "Device" must be in upper-case for the 99/4A to recognize it as a valid device name. "Filename" can be any combination of upper- and lower-case characters. If you have either a Disk Memory System or an RS232 interface, you should know this. *The Disk Memory System* manual recommends that filenames be only in upper-case because the Disk Manager (1) Cartridge won't display lower-case correctly. In a program where the user enters the filename, just add a CALL KEY(3,K,S) before the INPUT, LINPUT or ACCEPT (in TI Extended BASIC) statements. This allows entry of a correct filename

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Forth Floating Point Fixes

by Glenn Davis

Two tidbits for the Forth Forum this month. If you have ever tried using the -FLOAT words, you may have noticed that they are quite slow. How slow? I tried the *Creative Computing* benchmark by David Ahl in TI BASIC, Extended BASIC, and TI Forth. When TI BASIC beat them both, I knew something was very odd. Both BASICs beat Forth on this benchmark.

Since Forth interprets its code up to 40 times faster than BASIC does, I knew that the crawl was due to inefficiency. The -FLOAT routines are written in Forth, so they have a lot of overhead (from the "inner interpreter") for the amount of data moved. To help speed things up, I rewrote the -FLOAT routines as CODE words (that means they are in machine language, and are not transportable from one CPU to another) and fit them on the screens where the original words were. So, merely replace screens 45, 46, and 48 of a Forth system disk (not the original disk!) and you may load -FLOAT as usual. (Note: if you have a BSAVEd version that includes -FLOAT remember to re-compile, reload and re-BSAVE it).

Several of the words on SCR#46 have been modified and a few "unimportant" words have been removed, to save space in both the source and object codes. Note the sequence "12 SYSTEM" or "C SYSTEM" is used in several places in these words. I replaced them with XMLLNK. They are synonyms. -FLOAT always must have the synonyms loaded (since FRND uses RND, which is a -SYNONYM word).

Another screen that needed to be modified was SCR#48, which has words for compiling floating-point numbers and output. The word >F was too slow for me, so I did some tinkering and improved speed more than 75%. (Look the word up in the Forth manual if you don't know what it does) >F originally compiled the actual digit-string into the dictionary and did a conversion at run-time (bad move). This version converts the digit-string at compile-time. If the code is being interpreted, the number is left on the stack, otherwise it is compiled into the dictionary with code to push the value onto the stack at run-time. This process is completely transparent to the programmer, so >F will act just like the old version of the word, only much faster.

My other tidbit has to do with "undocumented" Forth instructions for the -FLOAT words. "Huh? The source code is all there!" you say? True. But five single-precision words do not have -FLOAT counterparts: ABS, MINUS, ROT, MAX, and MIN. ABS leaves the absolute value of a number and MINUS serves as a unary minus to negate a number. In this article I will address the first two and leave the remaining three for you to work out. They are REALLY easy. (Hint: just use the double-length words in the TI Forth manual as examples, and replace words referring to double-length numbers with their floating-point counterparts).

Often we need to multiply a floating point number by -1 or take its absolute value. Since words are not provided EXPLICITLY for these operations as they are with the other word sets (MINUS and DMINUS), I found the need to write some. In my prototyping to find the optimal code I realized that, due to the nature of the Radix-100 ROM routines, the single-precision words would work on floating point numbers too! In floating point, the top word on the stack (the "most significant" part of the 4-word value) is in two's complement if the VALUE is negative. The original TI User's Manual has an appendix on it, if you don't believe me.

To illustrate, type (with -FLOAT loaded already):

```
PI FDUP F. MINUS F. <ENTER>
```

and the computer will print PI and then its opposite. ABS will allow the FP routines to return only non-negative numbers:

```
PI MINUS FDUP F. ABS F. <ENTER>
```

Simple, quick, and elegant. That's what Forth is famous for. ●

see programs page 193

Some Suggested Readings

by Glenn Davis

Too many people ask me, "What can I use Forth for?" I can only answer, "What do you want to use it for?" If you use BASIC for anything, Forth can do it, and probably easier and will certainly be faster. If you don't program at all, then you can skip this article.

If you are interested in learning Forth, you should probably read a book on the subject. I won't be able to tell you everything that you need to know in this column, so please read two or more of these books. If you don't want to purchase them, check your local library. Check with friends. Even get together with friends and trade books. By all means read some! TI Forth is based on Forth Interest Group Forth (FIG-Forth). Any book that is applicable to FIG-Forth should apply to TI Forth as well. That said, we'll consider some books on Forth. This list is incomplete, but I can't afford to buy every book! Check your local bookstore for more recent entries.

The Granddaddy of all Forth books is *Starting Forth* by Leo Brodie (Prentice-Hall, 1981, 348 pages). I unconditionally recommend this book as your first reading on Forth. An appendix to the TI Forth manual demonstrates the differences between "Starting Forth" and "TI Forth." This book will teach the basics of Forth programming in a humorous style with many pictures and examples. Each chapter ends with simple problems that you should WORK to get a better understanding. If you don't, you'll miss some important things. The book applies to Forth-79 and poly-Forth as well as FIG-Forth, so all examples won't apply to TI Forth.

Many great works spawn sequels, and *Starting Forth* is no different.

Thinking Forth (Prentice-Hall, 1984, 294 pages), also by Leo Brodie, teaches Forth programming technique, not merely syntax of Forth. I found the cartoons in *Thinking Forth* funnier than those in *Starting Forth*, but your taste may be different. *Thinking Forth* is, according to the book, thinking elegant, thinking simple. It shows you how to develop readable (which is *very difficult* for novice Forth programmers), maintainable, and usable Forth programs. The Forth programming techniques taught are excellent, and takes time to master. But, FORTH-83 is the dialect used, not FIG-Forth. *Thinking Forth* requires that you understand Forth syntax. Read at least one other Forth book before reading this one or you might get lost!

Forth Progamming by Leo J. Scanlon (Howard W. Sams & Co., 1982, 214 pages) emphasizes FORTH-79 over FIG-Forth. However, most examples are poorly written and should not be stylistically imitated. The Forth words are long and rarely "decomposed" to simple terms. There is some worthwhile information (which can be found in other books), but not enough to justify a TI Forth user to buy this book.

Yet another book is *The Complete Forth* (Wiley Press, 1983, 115 pages) by Alan Winfield. The beginning of *The Complete Forth* makes numerous comparisons to BASIC, so programmers who know that language can transfer their knowledge to Forth. Later chapters show HOW to do things, not merely describing what to do. For example, it shows how to multiply 32-bit numbers together, with good comments. In addition, strings, fixed point math, and compiler extension and other topics are covered. The topics are covered quickly and it uses FORTH-79, but otherwise it is a good book which you may want to consider buying. *The Complete Forth* also contains a video game. I only had to make two changes in order to get TI Forth to run it. Drop me a note if you have bought the book and would like the changes.

One of two recent entries is *Forth: An Applications Approach* by David L. Toppen (McGraw-Hill, 1985, 209 pages). Unlike many of the other Forth books, especially recent ones, this book deals with FIG-Forth and only FIG-

continued on page 230

Data Transfer Protocol Translation

by Glenn Davis

This month's Forth Forum is a bit different. In past months, I've presented some utility routines that you could build on to make your own applications. This month I present a whole application.

One of the most difficult things about programming in Forth is that sharing routines is rather difficult. Even when you and the person you are sharing "words" with has a modem, transferring them often requires several steps. Normally, this would require transferring the Forth to a disk file and then using a terminal program to transfer the file, and finally changing the disk file back to Forth. Whew!

Using a modem, you are able to transfer Forth code directly from the "command" mode to the other system. It doesn't even have to be a TI! The original code for this appeared in *Forth Dimensions* (Vol 6, no 2) in an article by Keith Ericson and Dennis Feucht as FIG-Forth (what TI-Forth is based on) for several machines including the Apple II and the IBM PC. Screens 3, 4, and 5 are nearly identical to the versions for the other machines which allows source to be transferred to those machines. The first, second and last screens are my adaptation to the TI. The -CRU load option must be loaded, but the first screen will load it for you if you forget.

The routines are very easy to use. First, LOAD the first screen (wherever you decide to put it) and wait for it to compile. Then check your telecommunication connection by typing TERMINAL which puts you in a dumb "terminal" mode. You can even use this on BBSs. Exit back to TI Forth by pressing FCTN-4. When you are confident that everything works, start the transfer by typing in the form: scr1 scr2 XMT. (eg: 102 106 XMT.) If you are on the receiving end, just: scr1 RCV. The rest is automatic. Since Ericson and Feucht didn't include error checking, bad phone connections may garble some data forcing you to try again. If you have problems adapting this to your system (it is set up for 300 baud and the modem on RS232), then write me in care of the *Computer Shopper*, P.O. Box F, Titusville, FL 32781. ●

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TIMEX-SINCLAIR

Sinclair Survival Column

by Mark Fendrick

Believe it or not, this month's column marks the start of the third year here in *Computer Shopper*. Yet, unlike when it started, coverage includes an actively produced computer--the Sinclair (not Timex) QL. But all of those other models have not disappeared by any means, and so to start our third year together, let's look at something new for each model--from the ZX-81 through the QL.

It's not that often anymore that I come across new products for the T/S 1000 family (ZX-81, T/S 1000 & T/S 1500), but when I received a copy of E. Arthur Brown's (3404 Pawnee Drive; Alexandria, MN 56308; (612) 762-8847) newest catalog that is just what I found!

This month we will look at two new products for the T/S 1000 range of micros. Both of them take what is already a very powerful computer and add to its power and usefulness.

When I graduated from my T/S 2040 printer to an AERCO Centronics interface and full size printer, I got spoiled and put the small Timex thermal printer away. From time to time I found it necessary to make listings, printouts or screen dumps from my ZX-81, but as it was no longer my primary computer, I did not purchase an interface to enable me to use my Gemini 10X. Unfortunately the printout from the T/S 2040 would not serve many of my current needs. Now, however, that situation has been addressed by Fred Nachbaur, and Silicon Mountain Computers (C-12, Mtn. Stn. Group Box; Nelson, BC V1L 2J3; Canada).

The product which they have developed is a Universal Printer Driver (UPD), which allows any of the popular printer interfaces available to be used with the ZX-81, T/S 1000 - 1500 computers. It is, in fact, a collection of utilities which can be used to control a full size printer.

The Loader program is in BASIC, allowing a certain amount of user customization. It is totally relocatable, so that it can be used with practically any existing software regardless of memory requirements of the program. It may be merged with existing programs, used as an independent program, or have software developed around it. UPD can be located in the normal RAM locations (16K-64K) or the "transparent" 8K-16K area. The machine code itself uses just 1/2K (512 bytes) of RAM.

UPD can be used just as it comes, with most of the popular interfaces (both parallel and serial) available for either the T/S 1000 or T/S 2068. (Note: This is T/S 1000 software and not for use with a T/S 2068.) However, if you have a non-standard interface, or have constructed one of your own, full instructions on its use with UPD are included.

UPD supports COPY (full screen or partial screen), LLIST, or three different LPRINT forms--allowing use of upper and/or lower case printing with your T/S 1000 as well as ASCII codes. These routines are called via USR statements, which are given in the documentation. The exact calls are determined by where in memory you have located UPD, but the manual describes quite simply how to figure the correct entry addresses.

As an added bonus, there are other routines included with UPD in addition to the print routines. There is a CHECKSUM routine which when used both before SAVEing a program and upon LOADing it back (quite a chore with the T/S 1000) will verify a correct LOAD. An improved SCROLL is also included which improves upon the Sinclair BASIC version. Those of you familiar with the SCROLL in the original ROM know of the quirks which using it produces--such as delayed screen clearing. These drawbacks are eliminated using this new SCROLL.

A full disassembly of the code is provided, and the developer is very generous in permitting UPD's use in commercial software provided credit is given to Silicon Mountain Computers, and they are informed of its use.

Since a large number of T/S 2068 owners also have the earlier model(s) this is quite a useful piece of software.

A second T/S 1000 range program is a toolkit which adds more than a dozen new features to the operating system. The Delphic Toolkit uses 4K of memory in a location of the user's choice. As with UPD, the Delphic Toolkit can be located either within a program (in a REM statement), in any 4K region of the 8K-16K area, or in upper memory.

The toolkit is available in two forms, an EPROM version from its developer--Delphic Enterprises (P.O. Box 72205, Corpus Christi, TX 78472), or on tape thanks to a license agreement with Thomas B. Woods (P.O. Box 64, Jefferson, NH 03583) of Pro-File fame. Incidentally, the tape loader was written by Fred Nachbaur.

The routines in this package are invoked by way of a USR call rather than new keywords. A single entry address is necessary, and a call to that routine produces a menu from which the individual functions are selected. The routines which require additional information--such as start and end positions--prompt you for the required data.

When you first run this program, you are prompted as to where in memory you want to place the toolkit. The only requirement is that it reside in a single 4K area, as the program jumps around within that reserved area. The entry address is determined by the location in which you place the toolkit, and making a USR call to that address brings up the toolkit menu.

These are the routines included in this program:

Renumber—As the name implies, you can renumber your BASIC program listing from any line you desire through any later line. All GOTO and GOSUB arguments are automatically changed as well. An exception to this are GOTO and GOSUB statements which use computed destination addresses—such as GOTO 10*N. These statements will be ignored by the toolkit. You are able to specify the increment for the renumbered lines.

Copy—Like copy routines in word processors, this routine will take a block of your program and copy it at other point(s) in the listing. When it is inserted, the program lines are automatically renumbered to accommodate the additions. No changes are made, however, in the arguments of GOTO and GOSUB statements.

Move—Similar to the Copy routine, this function inserts a block of program lines into a specified spot. Unlike the previous routines the original block is deleted, and GOTO and GOSUB routines are renumbered.

Search—This routine will find each occurrence of a specified string. The type of string (characters, shifted characters, graphic characters, commands or functions) makes no difference to the toolkit. This can allow all variable names, prompts, etc. to be changed at every point in which they appear. The BASIC program lines are printed to the screen, and you are given the option of having a copy sent to your printer, if one is attached.

Delete—This is used to simply remove from your program all lines specified.

REM Kill—In order to conserve memory you might want to remove all REM statements with this selection.

REM Generate—If you want to create REM statements to store machine code routines in your BASIC programs, this function will generate the line with the number and type of characters you indicate.

Variables Print—For a list of all the variables and their current values, you would choose this function. The listing includes the type of variable (number, string, array or for-next), the variable names (and dimensions if it is an array) and the values. For-Next variables will show the current value, limit and step. You are also given the option of copying any screen to a printer.

Hex-Decimal Conversion—By invoking this function, you can toggle back and forth between hex to decimal or decimal to hex conversion.

Free Space—This routine will display the number of bytes between STKEND and the machine stack pointer SP. This will, under normal circumstances, show you the amount of spare memory.

Program Size—The amount of memory used by any given segment of a BASIC program is displayed by this command. The number of bytes used by the variables may also be included.

Non-Volatile Memory Storage—This routine is for use with the Hunter Non-Volatile Memory Board. There are both Store and Restore routines included.

Merge—By placing the program currently in memory above RAMTOP, you can LOAD another program and then have it MERGEd with the original. You may have to first use the renumber routine so that line numbers do not conflict. You may make multiple MERGEs.

Tape Index—When you select this option and play a program tape, you will get a directory of the programs recorded on that cassette. A hard copy may be made and stored with the tape.

Unlock—This routine would be used when you want to LOAD a self-starting program without having it automatically execute upon LOADing. This works with any program SAVEd using the normal BASIC.

Quit—A simple procedure for leaving the toolkit and re-entering normal Sinclair BASIC method.

Delphic Toolkit comes with a well written 12 page user's manual. For anyone still doing serious programming on a T/S 1000 compatible computer, this is a definite help.

Moving along to the T/S 2068, we look at two Spectrum games which can be played on an emulator equipped American computer. The vast majority of new releases for the Spectrum are games, and these two are among the best I have seen.

The first of these games is World Series Baseball from Imagine Software, Ltd. (It is also available for the Commodore 64.) What is so unusual is that it is for the British Spectrum owner—who may have little or no idea of the game of baseball. The promotional material reads, "Prior knowledge of baseball not es-

continued on next page

Timex-Sinclair continued from page 87

sential—self demo for instructions...with real Baseball features including—Steal Options, Curved Balls, Pitcher Throws, Cheerleaders and all the razamatazz of the U.S.A." But terminology aside—and when did you ever see cheerleaders at major league games? The rules seem to be quite well understood by the programmers. The insert that comes with the program attempts to compare baseball to the British game of rounders from which baseball evolved. I must admit that this made reading the rules a bit confusing for me—terminology again—but having been a baseball fan since rooting for the Brooklyn Dodgers, I proceeded to actually playing the game.

This game can either be played using joysticks or keys, and two players can compete against each other or a single player can play against the computer. If you are going to use the keyboard, you may define your own keys. You may also set the number of innings you wish to play (3, 6 or 9) and the difficulty. You even have the choice of colors for each team.

When you first enter the program the national anthem is played and the cheerleaders (?) romp across the field! The home team takes the field and the first batter comes to the plate. The pitcher's delivery and pitch are followed close-up on the scoreboard, as well as showing the batter when the ball reaches the plate. The shadow of the ball creates an excellent feeling of perception and helps the batter's timing. The pitcher controls both the speed and height of the pitch. Balls, strikes and outs are shown on your display.

Once the ball is hit, the computer selects the most reasonable fielder to field the ball and attempt the put-out. Sometimes however, I found the choice of fielders to be questionable at best. The batter can be put out by either tagging the runner off the base, or through a force play. If the lead runner is adventurous enough, he can steal a base.

You have some control over placing your outfielders only—the infielders are assigned positions. Between each pitch you may either move your outfielders in or out. When you pull them in, they are practically in the basepath, and sending them out can only be described as shallow. I would have liked to play them deeper than allowed.

Between innings music is played, and advertisements (for British companies and products) are displayed on the scoreboard. A nice touch.

The graphics are superb, and some of the extra touches really add to the value of this program. For a sport with which the British are not familiar, this is quite a good simulation of our national pastime.

Elite Systems, Ltd. has brought boxing to the Sinclair computers through their program, "Frank Bruno's Boxing." Aside from the excellent graphics and animation, this program is unusual as it allows you to fight eight different opponents. In order to meet your next opponent however, you must defeat your current adversary.

There are eight different nationalities represented in this stable of fighters. When you first play the game you go against the Canadian Crusher—big but not very smart. If you defeat him you receive a code which allows you to LOAD the next boxer on the tape. You then attempt to defeat Fling Long Chop (Japan), Andra Puncheredov (U.S.S.R.), Tribal Trouble (Africa), Frenchie (France), Ravioli Mafiosi (Italy), Antipodean Andy (Australia) and finally Peter Perfect (U.S.A.). Each boxer is more difficult to defeat than the one before. I still haven't gotten past Fling Long Chop who continually jumps up and kicks me in the head!

The game is keyboard controlled, utilizing eight boxing moves (guard up, duck, guard down, right hook/uppercut, dodge left, left punch, right punch and dodge right). It is your job to combine these moves to protect yourself, find your opponents weakness, and knock him out. Rounds are timed for three minutes and you must knock your opponent down three times before you can achieve a knockout. Of course you also have to protect yourself from being knocked out. Time and players status (strength remaining) are displayed on the top half of the screen while the bottom portion displays the scrolling action—like watching the bout on T.V.

Aside from being one of the finest animation jobs I have ever seen, this game will keep you at your computers for hours on end. Quite an improvement over the earliest computer games. These programs can be bought from many American Sinclair dealers or directly from software dealers in the U.K.

The amount of QL software available at the moment is not overwhelming, but as programs are checked for compatibility, the American QL dealers are making them available. However, the QL is targeted as a business computer, and the software which was developed for the British market often doesn't meet the needs of the American business. This is being addressed by U.S. programmers such as myself who are now developing U.S. specific packages. It will probably be late in 1986 until these programs reach the market. In the meantime the British importers have the field to themselves.

One of the currently popular imports is Icon Controlled Environment (I.C.E.) from Eidersoft. For those of you unfamiliar with this system it is a system which makes cataloging, copying and backing-up files simpler than by using the SuperBASIC commands (such as dir, copy and delete). However, that is not what makes this product so popular—it is the I.C.E. screen which is its main feature. Instead of a blank screen upon pressing F1, I.C.E. shows a screen with a number of icons, or pictures—a calculator, calendar, microdrive cartridge, floppy disk, RAM disk, trashcan and ESC. The time is displayed on the top, and a menu along the bottom.

A small arrow is controlled by the cursor keys, a joystick, or (soon) a mouse. By placing the arrow over the picture of one of the storage devices you have in operation, and pressing the joystick button (or spacebar) twice in succession, you get a graphic directory of the files on any media in that device. (To catalogue a cartridge in microdrive 1, SuperBASIC requires that you type: dir mdv1_:)

Each file is represented by a graphic and the name of the file. The type of file determines the type of icon shown. An Archive file is represented by a filing cabinet, Easel files by a small graph, Abacus files show an abacus, and Quill files are displayed as a dog-earred sheet of paper. A SuperBASIC file shows up as a microdrive cartridge bearing the inscription SB, while execuable files say EX. Export files are represented by a small suitcase. Any other type of files are represented by a standard file folder.

A backup cartridge can be created in one simple step by selecting the BACKUP option on the menu. In SuperBASIC, each file would need a statement to copy from one cartridge to another. (Assuming you are copying from microdrive 1 to microdrive 2, each file would need a statement such as:

COPY MDV1_*filename* TO MDV2_*filename*

A cartridge with many files can be quite a project! I.C.E. will even enable you to copy files from and to the same device. If you have to update a particular file which already exists on a backup cartridge, you first have to delete it and then re-COPY it. With I.C.E., this is done in one quick procedure. To completely delete a file, you just have to "place it in the trashbin." Many other file handling and viewing options are simplified using I.C.E. A bonus of using I.C.E. is that each file is created with the data and time included so that when you use the INFO menu option, you know when the last update was made.

By selecting the calculator, a calculator appears on the screen which you can use as needed, and the calendar page opens a window with a calendar. This calendar starts with the present month, and you can move back and forth as required. If you use either of these features while a directory is on the screen, it is still intact when you remove them.

I.C.E. is supplied on a ROM cartridge which fits into the slot on the back of the QL, so it is always available, using virtually no RAM (a so-called Front end program). A microdrive cartridge is also included (although many dealers are now selling each component individually), containing CHOice. CHOice contains mailmerge, multitasking and RAMdisk capabilities. To fully make use of the multitasking and RAMdisk features, you should, however, have more than the 128K that comes with the QL. The RAMdisk ability is especially useful when using a program, such as Quill, which swaps information back and forth from storage, particularly when the file gets so large that Quill sets up a temporary file (def_tmp). When setting up and directing data to a section of RAM, this makes the transfer of data almost instantaneous. Keep in mind, however, that this information will be lost unless it is ultimately copied to a permanent storage medium. I.C.E. makes this procedure a snap.

A major drawback of I.C.E., however, is of concern to those who use F2 because they are using a TV or their monitor overscans on the F1 setting. Using F2 causes the menu portion of the screen not to show up. For all practical purposes this makes I.C.E. unsuitable for those who cannot use F1.

At the time of this writing, Foundation Systems (17620 26 Mile Road; Washington, MI 48094; (313) 781-5800) is including I.C.E. with CHOice free with each QL purchase. ●

C. Itoh — New Wide-Carriage Daisywheel

A new 136-column, Diablo 630-compatible daisywheel printer with a speed of 40 characters per second has been introduced by C. Itoh Digital Products.

Called the D10-40, the new printer has an acoustic noise level of less than 60db, making it substantially quieter than previous models.

Among the features on the new printer are three character pitches allowing the creation of spreadsheets up to 203 columns wide, compatibility with the entire range of Diablo printwheels, 8-bit parallel and RS232C serial interfaces, and an 8K data buffer standard.

Options include an Auto Sheet Feeder, and a tractor feed mechanism to simplify paper handling.

Suggested retail price for the new D10-40 is $949.00, which includes the one-year C. Itoh warranty.

For more information, contact Itoh Digital Products, Inc., 19750 South Vermont Avenue, Suite 220, Torrance, California 90502; (213) 327-2110 or (800) 423-0300.

MasterForth Application Generation System Now Available

A complete MasterFORTH Target Application Generation System (TAGS) is now available from MicroMotion. TAGS lets you produce optimized application programs for virtually any programming environment. The TAGS package includes the MasterFORTH development system, the Relocator and utility source files, the target compiler, and RAM and ROM dictionary source files. All unused commands in the forth dictionary can be identified and stripped away. Application programs can be generated without headers to further decrease their size and programs for one computer can be created on another. The MasterFORTH target compiler is capable of generating either RAM-based or ROM-based applications.

TAGS is currently available for Macintosh and IBM PC developers. The MasterFORTH development system is also available for the Apple family, the Commodore 64 and Z-80 CP/M. MasterFORTH retails for $125.00 and TAGS for $495.00. Several additional extensions are also available.

For more information contact: MicroMotion, 8726 Sepulveda Bl. #A171, Los Angeles, CA 90045, (213) 821-4340.

Spotlight On Business

Spotlight On Medical Resources

Part I

by Barbara and John McMullen

Medical Software & Services: An Exploding Market

The universe of computer software and services that exists to support the medical field is vast and, as with any vertical market, subdivides into many categories of interest to particular sections of the medical community.

For the purposes of this study, we will exclude products and services that exist only to serve the dental community (and will, if interest warrants, consider computer support of dentistry in a later article of its own). Even with this exclusion, there is still a tremendous amount of product available to serve the medical community (as evidenced by Table 1 which contains descriptions of 180 programs that support this market). In an attempt to present this market in a manageable fashion, we have chosen the following categories to examine in this piece:

1. Office Management Software
2. Diagnostic Software and Services
3. Other Software and Services

This breakdown is arbitrary; the *PC Buyers Guide*, published by Ziff-Davis, which lists available software by category subdivides "Health Services" into "Diagnosis/Treatment," "Hospital/Nursing Home Administration," "Practice Management" and "Other."

1. Office Management Systems—The major impact that has been made by computers on the average physician in private practice has been in the area of performing the accounting and patient record-keeping functions attendant to any medical practice. This type of computer support has become more and more important in recent years as a greater and greater percentage of the average physician's income comes from reimbursement from governmental agencies and private insurance carriers. To ensure that proper payment is received from these payers, care must be taken in preparation of the input necessary to support the payment claim. The forms submitted must contain the proper treatment code for which payment is requested; failure to submit properly may invalidate the claim. Additionally, many of the larger insurance carriers will now accept direct computer transmission of claim material; such transmission reduces the turnaround time on payment.

Beyond interaction with insurance companies, the average Medical Office Management System will manage an appointment calendar, produce direct billing to private patients and perform accounts receivable, accounts payable and general ledger processing. It will further either perform its own analytic reporting or interact with one of the popular spreadsheets (usually Lotus 1-2-3) for that purpose. There are many Office Management Systems commercially available (Table I contains descriptions of a number of such systems) and some vendors will provide sample diskettes for review (ex. Professional Data Management, Inc. (612) 731-1822; Health America Systems, Inc. (312) 362-3730). The accompanying small piece on Dr. Bill Merlino examines one private practitioner's experience with computers.

2. Diagnostic Software and Services—This category encompasses both software and services and is constantly expanding as more and more data is available at reasonable costs and sophisticated software moves closer and closer to providing true "expert systems" capability (more on expert systems later). The biggest breakthrough to date has been an explosion of data that may be accessed through a personal computer at reasonable costs. A doctor in an office or research facility may simply instruct her/his computer to dial a number and will almost immediately have access to current journal articles on a specific subject, directory of doctors and hospitals providing a certain treatment, a listing and explanation of new drugs and other related medical subjects.

To utilize such services, the user must have a modem and a communications program. Once these elements are in place, the user must either be a subscriber to the particular service that is desired or a subscriber to a "gateway" service which provides access to a number of services. One such gateway is "Bibliographic Retrieval Services" of Latham, NY ((800) 833-4707; NY State; (518) 783-1161). In addition to its full service prime time system, BRS provides a lower cost ($6 - $15 per hour compared to $16 - $110 per hour for the full prime time service) service called "BRS After Dark" that is available evenings and weekends. The "After Dark" service has less search capabilities and has fewer available data bases but it is an economical alternative to the higher priced comprehensive data bases. BRS provides "Medline," a service of the National Library of Medicine which contains journal articles (1966 - present) as well as chapters of selected multi-authored works in all areas of clinical medicine, biomedical research and health services education, administration and practice (Carol Hansen, in her book *The Microcomputer User's Guide To Information OnLine*, says that "Medline"

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Bill Merlino — Computers In The Office

Bill Merlino is a doctor in the small town of Mays Landing, New Jersey, a hamlet approximately 10 miles south of Atlantic City. He is a fellow of the American Academy of Family Physicians and is Board Certified in Family Practice. He is also a "computernik" and his interest in computers led him to become one of the first Apple dealers on the east coast. Although he is no longer active in the firm that he founded, "Jonathan's Computer" of Marleton, NJ, he remains extremely interested in the use of computers in the medical profession and uses a network (Omninet) of Compaqs, ITTs and IBMs to manage his daily flow of patients and maintain his patient billing and accounting records. He also has utilized his NEC briefcase computer to take notes on during his rounds in the nursing home where he is Chief Physician and uses computer based devices in his medical laboratory. With this background, we felt that Bill was an excellent person to discuss those areas in which computers may aid the physician in private practice.

Since Bill's initial purchase of computers for medical office management far preceeded the development of the many office management systems listed in Table I, he designed and wrote his own system. This system is now in its third iteration having originally been written in BASIC, rewritten in Pascal and finally redone in a system based on Applied Software Technology's "VersaForm" database manager. The present system maintains patient records, performs "daysheet" cash balancing, billing and accounts receivable processing, generates the proper input for Medicare/Medicaid and insurance reimbursement and generates patient reminder letters for annual physicals, vaccinations and testing. It also functions as an management tool to analyze occurences of illness, determine unprofitable procedures, and perform budget planning. The analysis portion of the system is rooted in "The Smart System" integrated spreadsheet, database management, word processing, graphics, communications and time management system from Innovative Software (Data passes automatically from "VersaForm" processing to "Smart.") The system is networked with workstations at the receptionist's desk, secretarial locations, treatment rooms and in Bill's private office.

Another integral part of the system is the DOS-resident "Spotlight" program, originally developed by Software Arts and now marketed by Lotus Development Corp. A complete listing of the medical procedure codes needed for insurance reimbursement is maintained in a Spotlight notefile and may be accessed at any time as the patient billing information is being updated. All telephone numbers are maintained in the Spotlight telephone directory which will initiate automatic dialing at a moment's notice. Additionally, the office appointment calendar is maintained in the Spotlight appointment book and is readily available for interrogation and updating—"Although Spotlight is called an accessory program, it is much more than that in our system; in many ways, it is the control point of the system and we are very pleased with it."

In addition to the office management system, Bill utilizes the "Cardio-Analyzer" computer based EKG system which allows him to record both EKGs taken in the office and EKGs taken at the nursing home (recorded using a "Ram Recorder") for computer storage/analysis. Additionally, the computer EKG analysis may be sent electronically to a cardiologist for further study.

Bill feels that the greatest impact that computers can make in medical treatment may be in the area of computer-based testing devices—"The MRI (Magnetic Resonance Imaging) is a fantastic machine. It provides clear images to doctors without exposing the patients to radiation and is particularly useful in detecting multiple sclerosis. I feel that there will continue to be dramatic progress in using computer-based devices for diagnostic purposes."

Although Bill Merlino is totally committed to technological assistance to physicians, he is not blindly wedded to using computers for computers sake (he stopped using his hand held NEC for patient notes during nursing home rounds when he determined that it was less efficient than using a tape recorder which was then turned over to a secretary for transcription). He feels that physicians must examine their own routine and then utilize a system that, as much as possible, eliminates clerical tedium "Let the doctors doctor and the computers computer!"

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may be the most used of all online data bases). In addition to providing "Medline" (which can also be accessed directly, BRS also provides its own "Pre-Med," a small data base that contains current articles not yet incorporated into "Medline."

Other data bases of interest to the medical profession include:

a) *AMA/NET*—a service of General Telenet Medical Information Network ((703) 442-2500), "AMA/Net" contains the *Drug Information Base* containing critical evaluations of 1200 drugs marketed under 4000 trade names, *Current Medical Information and Terminology* containing brief descriptions of diseases, disorders and conditions, *Physicians' Current Procedural Terminology* and *Socioeconomic Research Resources* which covers articles on the non-clinical aspects of health care. The same vendor also provides "*Med/Mail*" which allows the user to send messages to other subscribers, order documents from the AMA Library and use "bulletin-board"services.

b)*PDQ (Protocol Data Query)*—a service of the National Cancer Institute ((301) 496-7403), "PDQ" describes approximately 700 general cancer therapy research protocol descriptions and lists the institution (and oncologist to contact at the institution) where the protocol is being used.

c)*Toxline*—a service of the National Library of Medicine ((301) 496-6193) under the "*Medlars Online Network*," "Toxline" contains over 1.4 million references covering the pharmacological, biochemical, environmental and toxicilogical effects of drugs and other chemicals. The same vendor also provides, among others, "*Medline*"(described above),"*Histline*" (History of Medicine Online), "*PDQ*" (described above), "*Cancerlit*" (Cancer Literature), "*Cancerproj*" (Cancer Research Projects), "*Clinprot*" (Clinical Cancer Protocols) and "*Bioethicsline*" (a collection of references to documents which discuss ethical questions in health care or biomedical research).

d)*Health Education Network*—a service of The Ohio State University College of Medicine, this network offers students the use of computer-assisted instruction programs to increase their medical skills. The students utilizing this system may include patients as well as medical professionals. A similar service, aimed totally at medical professionals, is offered by Massachusetts General Hospital and is called "*MGH.*"

e)*Telgenline*—supplied by EIC/Intelligence ((800) 223-6275; NY - (212) 944-8500), this services summarizes multidisciplinary research in recombinant-DNA technology.

There are many other data bases available to the medical profession. Those interested in exploring this subject further may refer to *The Computer Data and Database Source Book* by Matthew Lesko (Avon, 1984), *The Microcomputer User's Guide Information OnLine* by Carol Hansen (Hayden, 1984) and *Omni Online Database Directory* by Edelhart & Davies (Collier Books, 1983).

While the use of online research data bases has expanded dramatically in recent years, the use of diagnostic programs has not yet caught the fancy of the medical community. There are far fewer programs available of this type than for other health services categories (the 1985 Summer Ziff-Davis *PC Buyers Guide* lists only 23 "Diagnostic/Treatment" programs (of which 16 have to do with diet or nutrition) while the same publication lists 149 programs in the Practice Management category. There are a number of programs in this category listed in Table I including a series of programs from Cogitum Medical Software, Inc. that help analyze such common problems as headache, backache and neck, arm & hand pain.

The most interesting technological aid to diagnosis is one that is still a long way from realizing its potential—*Expert Systems*. The term "Expert Systems" is defined by Professor Edward Feigenbaum of Standford University, one of the pioneers in the field as "*an intelligent computer program that uses knowledge and inference procedures to solve problems that are difficult enough to require significant human expertise for their solution. Knowledge necessary to perform at such a level, plus the inference procedures used, can be thought of as a model of the expertise of the best practitioners in the field.*" Feigenbaum goes on to say "*The performance level of an expert system is primarily a function of the size and quality of a knowledge base it possesses.*"—and this statement points to one of the problems to date with expert systems; there has not been the sufficiently fast mass storage available at the personal computer level necessary to provide acceptable performance to support the average physician. Additionally, there is the problem of building and maintaining an extremely large data base. Finally, there has been the problem of developing the expert rules necessary to interrogate the data base. The rule language (or computer program) that the user must master to properly utilize the data base must be both efficient and easy to use. The lack of such an interface has held back a good deal of progress in this area.

One of the early attempts to develop such a system is "*Mycin*," developed at Stanford University in the mid-1970s and designed to aid physicians in the diagnosis and treatment of meningitis and bacteremia infections. The system carries on an interactive dialogue with a physician and is capable of explaining its reasoning. The system also includes "*Teiresias*," a knowledge acquisition subsystem, which helps expert physicians expand or modify the "Mycin rule base (the rule base presently contains several hundred production rules representing human-expert-level knowledge about the domain. Persons wishing to know more about "Expert Systems" may consult *The Handbook of Artificial Intelligence* by Barr & Feigenbaum (William Kaufmanm, Inc., 1981), *Expert Systems* by Harmon & King (John Wiley & Sons, 1985) and *Artificial Intelligence* by Patrick Henry Winston (Addison-Wesley, 1977; rev. 1979) (pages 241-243 give an example of a physician using "Mycin").

3. *Other Software and Services*—This category, a catchall for all of the remaining software available to the medical community, contains software for an area that is requiring more and more help from technology—*Hospital and Nursing Home Administration*. A significant reason for the increased need for computerization was the federal government's decision to change the method of reimbursing hospitals for Medicare patients. The government has developed "diagnosis related groups" (referred to as "*DRGs*") for which set reimbursement payments are made no matter how long the stay in the hospital. It is now to the hospital's best interest to control the length of hospital stay and to control all other costs when possible. Hospitals are now spending much more attention to financial planning and analysis than ever before and PCs fit right into this picture. Spreadsheet analysis, using 1-2-3 and SuperCalc, has become very popular as has the use of specific programs needed for the industry (The Ziff-Davis Buyers Guide lists 55 products in this group). It is safe to say that it will take a few years until the software expands rapidly enough to keep with user desires.

Another special service is "*Immunization Alert*," an interactive on line system that provides travelers with up-to-date listings of innoculation requirements, general health warnings, and tips for travelers. In short, products exist for a wide range of activities (from management of an ambulance service to controlling a home health care service).

Conclusion

Computer aid to practice management is now a mature sub-industry and many fine products exist; support to other areas of the medical universe are still expanding rapidly as mass storage and high speed communications become more economical. We presently find a number of fine products and services available to serve other areas functions; there will be many, many more such products available in the near future.

-- Barbara & John McMullen are founders of the consulting firm of – McMullen & McMullen, Inc. and are frequent contributors to Computer Shopper and other leading computer publications

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TABLE I

Representative Medical Software

Selected From DIALOG's Software Database (For further information concerning these products, call 1-800-THE-MENU)

FORESIGHT

FALCON SOFTWARE

Optometric Information Management System. Includes: Cash Control, Inventory Control, Practice Analysis, Billing, A/R and more. Patient Information—consists of the identifying data for a patient and the patient's bills. All data can be DISPLAYED on the screen or PRINTED on the printer. FORESIGHT can FIND PATIENT INFORMATION in many different ways making it SIMPLE to select groups of patients with common characteristics for research of communicating information of common interest. History—an electronic notepad where you can record dates and comments related to frequently performed procedures and tests. Dates can be coded with information designed to give you ACCESS TO SELECTED PATIENTS with specific problems. Prescription— information provides a COMPLETE RECORD of the measurements and unique data associated with glasses or contact lenses. The system is designed to store information for multiple pairs per patient and can display this information on the screen or the printer. Timely and Consistent Recall—reminders are a proven method of building practice. The system even keeps track of patient responses and automatically sends FOLLOW-UP notices to patients who have not responded to an initial notice. Correspondence—incorporates the ability to SEARCH the patient data and SELECT patients with characteristics specified by you. An instant you can locate all patients with common characteristics (i.e. all patients who wear extended wear contact lenses or who have not visited your office for some specified time). Search and select capability is coupled with a correspondence function that COMMUNICATES INFORMATION OF INTEREST, prints mailing labels, patient data or simply a list of patients. Cash Control—automates recording and pricing of services rendered and produces receipts for payment. The computer records all transactions, RECONCILES DAILY CASH receipts, records and REPORTS the complete daily sales activity and automatically produces daily bank deposit slips for all cash and checks as well as each credit type you accept for payment. Inventory Control—is integrated with the cash control function and automatically UPDATES INVENTORY for items which are dispensed. The current status of any item viewed on the screen which displays the quantity on hand, average cost, price, sales for the month and the year and vendor information. Reports include complete inventory status, sales activity and a reorder report which identifies those items which must be restocked. The inventory reports can be isolated by vendor so you can be prepared with the right information when a salesman comes to call. Practice Analysis—is integrated with the cash control function and produces REPORTS OF SERVICES PERFORMED. A report for each member of the staff and a consolidated practice report show the number of each service performed, the income derived

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ROBOTICS

Heath Company Introduces Hero 2000 Educational Robot

Heath Company, a leader in robotics and electronics education, has introduced the latest addition to its line of educational robots, HERO 2000.

The new robot is the centerpiece of a total learning system that also includes three comprehensive educational courses designed to teach students and industrial workers the concepts of automation and robotics.

"Because of the rapid growth of automation and the use of robots in American plants, the training of present and future workers in the basic concepts of robotics and automation has become a national priority," said William E. Johnson, president of Heath.

HERO 2000 and the automation education courses represent the most comprehensive and cost-effective automation learning system ever produced for wide-scale distribution, Johnson said.

"The extensive capabilities built into HERO 2000 make this robot an effective low-cost automation trainer for schools and industries," Johnson said. "HERO 2000 helps students and workers learn job skills that are marketable in today's world."

The new robot simulates virtually every automation process currently in use in industry. The learning system covers the concepts of robotics, process control, factory automation, computer-assisted-design and computer-assisted-manufacturing (CAD-CAM), and the interfacing of computers with machines.

HERO 2000 stands 32" tall and weighs 78 pounds with arm in place. A powerful 16-bit 8088 master processor controls all operating systems. Eight closed-loop DC servomotors power the robot's drive, torso and arm movement. Eleven 8-bit (8042UPI) slave microprocessors controlled by the master processor permit simultaneous I/O functions.

On-board ROM is 64K and includes a specially enhanced BASIC as well as demonstration programs, direct text-to-speech conversion and diagnostic routines. With optional accessory boards, HERO 2000's on-board RAM can be expanded from 24K to over one-half megabyte.

A unique remote console with RF link permits complete control and programming of all robot functions up to 100 feet away. The console features an ASCII keyboard, teaching pendant controls, and a 2 line by 40 character LCD display.

An optional on-board disk drive allows the robot to function as a disk-based 16-bit microcomputer.

A single 24 amp hour gel cell battery powers HERO 2000 for up to six hours of normal operation. An optional auto-docking system permits autonomous operation by allowing the robot to find its power charger and plug itself in when the battery is running low.

The robotic functions of the trainer include a fully articulated arm with five axes of motion. Its gripper has a patented Sense-Of-Touch system that adjusts gripping force and senses object size. The gripper has a maximum closing force of 3.75 pounds.

Sensors in each of the robot's closed-loop DC servo motors feed position information back to a slave microprocessor, allowing the robot to "know" what the motors are doing and where they are at all times.

HERO 2000 has two sonar transducers which sense objects and movement up to 10 feet away. The head-mounted sonar unit scans 360 degrees while the base unit points straight ahead.

Other built-in sensors include a light detector that scans 360 degrees, sound detector, and temperature detector. A voice synthesizer produces an unlimited vocabulary of human-like speech, four octaves of music, and various sound effects. A direct text-to-speech conversion capability allows the operator to program robot speech simply by typing on the remote console whatever he wants the robot to say.

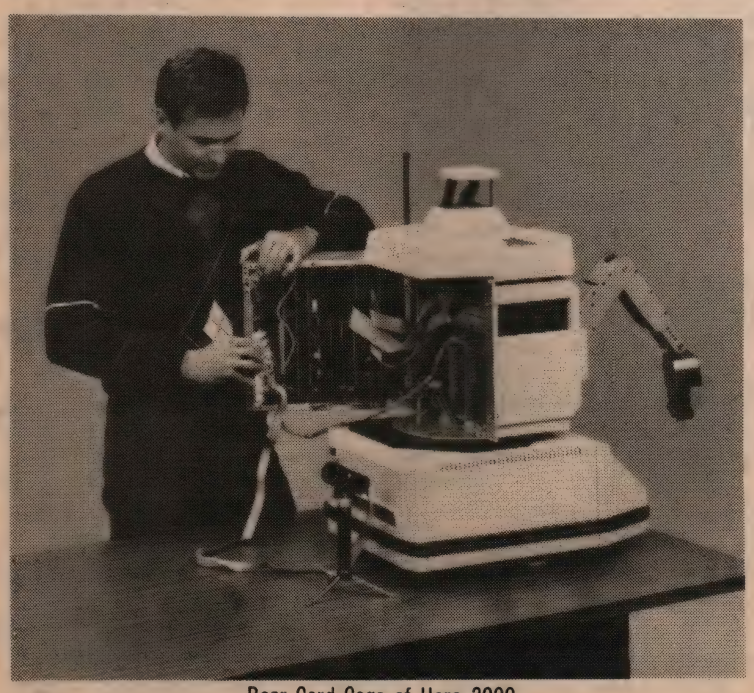
"HERO 2000 makes learning fun," Johnson said. "There is something about HERO 2000 that makes you want to discover how the robot works, and how to make it do new tasks."

Available with the HERO 2000 Learning System are

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Hero 2000 Robot



Rear Card Cage of Hero 2000

Hero 2000 Specifications

Major Features

Articulated arm • Gripper with patented sense-of-touch system • Remote control console with typewriter-style ASCII keyboard, 80-character LCD display and teaching pendant controls • Two-way data link between console and robot • Electronic voice synthesizer • Direct text-to-speech conversion • 16-bit master processor and eleven 8-bit slave microprocessors • Powerful two-wheel dual servomotor drive system • Optional on-board 5¼ in. DSDD disk drive • 64K ROM • HERO 2000 BASIC • 24K RAM expandable to 576K • 360° sonar and light scanner • Temperature and sound sensors • Optional Auto-dock system • Powerful, rechargeable gelled electrolyte battery

CENTRAL PROCESSING UNIT (CPU)

16-bit Processor	Type iAPX88/10 (8088).
Clock Rate	5 MHz.
On-Board Memory	ROM: 64K x 8, expandable to 96K x 8. RAM: 24K, expandable to 576K.
Interrupts:	
Controller	Type 8259A.
System	8-level priority vector interrupt and nonmaskable interrupt.
Programmable Timer	Type 8253-5.
DIP Switch	One.

MOTOR CONTROLLER

Controller	8042 UPI.
Channels	Three.
Mode	Pulse width modulation.
Motor Voltage	12 VDC.
Motor Current	8 A maximum
Speed Regulation	Yes.
Position Seeking	Yes.
Self Initializing	Yes.
Position Tracking	Yes.

INPUT/OUTPUT (I/O)

SENSES

Sound	255 levels.
Temperature	+60°F to +90°F.
Light	255 levels at 24 bearings, 15° apart.
Voltage	Reads relative battery condition.

SERIAL PORTS

Number	Two DCE, RS-232C.
Type	2661-2.
Baud Rates	Selectable: 45 through 38400.
Stop Bits	One.
Parity	None.
Handshaking	Positive or negative.

CASSETTE PORT

Data Rate	300 baud.
Frequency	2400/1200 Hz.
Audio Output	500 mV (P-P).
Input Sensitivity	500 mV RMS.
Motor Control	20 VDC maximum.

RTC, KEYPAD, AND DISPLAY PROCESSOR

Type	8042 UPI.
Keypad	Hexadecimal.
Display	7 segments.
Functions	Time, day, date, leap year, and daylight savings.
Status Indicators	8 user-definable plus charging, power, full charge, low battery, voice, cassette, transmit, and receive.
Sleep Time	1 minute to over 45 days.

COMMUNICATIONS PROCESSOR (Optional)

Type	8042 UPI.
Functions	Communicates via RF link; controls system reset.

SONAR PROCESSOR

Type	8042 UPI.
Transducers	Two.
Bearings	24, 15° apart.
Range	4.5 inches to 10.5 feet.
Increments	0.5 inch.

VOICE

Synthesizer	SSI 263A.
Programming	Text to speech, phoneme, and sound effects.
Duration	Four settings.
Speech Rates	16.
Inflection	4096 levels.
Amplitude	16 levels.
Articulation	8 rates.
Vocal Tract Filter	250+ settings.
Phonemes	64.

POWER SUPPLY

Battery:	
Voltage	12 V.
Capacity	24 Ah.
Charge Rate	5A maximum.
Battery Life	4-6 hours from full charge; up to 6 days in "sleep" mode
Power Supply Ratings:	
+5 V	10 A maximum.
+24 V	0.1 A maximum.
+12 V	1 A maximum.
+5 V sleep	1 A maximum.
Low-Voltage Detector	Interrupt.
Full Charge Detector	Visual.

CHARGER

Output Voltage	+19.2 VDC minimum.
Output Current	7 A maximum.
Input Voltage	105-135 VAC/210-270 VAC.
Automatic Docking	With optional docking package.
Charging Time	Approximately 5 hours if robot not in use.

MECHANICAL

Maximum Speed (base)	16 inches/second.
Torso Rotate Speed	18 degrees/second.
Torso Travel	−165° to +180°.
Weight (with Arm)	78 lbs. (35kg).
Dimensions	16.5" W x 22.5" L x 32.4" H (41.9 x 57.2 x 82.3 cm).

ARM

Arm Payload	1 lb.
Arm Travel:	
Arm	0 to +120°.
Elbow	0 to +180°.
Wrist Pivot	−90° to +180°.
Wrist Rotate	−179° to +180°.
Gripper Closing Force	3¾ lbs. maximum.
Gripper Opening	4⅜" maximum.
Position Sensing	10 steps.
Force Sensing	Closing: 9 steps (0-8). Opening: 7 steps (0-6).

ARM MOTOR CONTROLLER CARD

Controller	8042 UPI.
Channels	Five.
Mode	Pulse width modulation.
Motor Voltage	12 VDC.
Motor Current	8 A maximum.
Speed Regulation	Yes.
Position Seeking	Yes.
Self Initializing	Yes.
Position Tracking	Yes.

REMOTE CONSOLE

OPERATING MODES

Terminal Mode:	
Operation	Full duplex.
Baud Rate	110, 300 or 600.
Auto-Repeat	Yes.
Auto-Scroll	Yes.
Protocol	Control-S/Control-Q.
Link Mode:	
Operation	Links external device over RF link.
Baud Rate	110, 300 or 600.
Echo	May be enabled or disabled.
Protocol	Either Control-S/Control-Q or ANSI escape sequences used to disable/enable keyboard.
Remote Mode:	
Operation	Terminal or teach pendant for the Robot.
Range	100 feet line-of-sight minimum.
Frequency	75 MHz band.
Transmission Rate	33 characters per second.
Protocol	Robot must receive permission to transmit to insure that Remote is ready.
General:	
Keyboard	ASCII elastomeric.
Display	80 characters LCD.
Overall Size	16" W x 6⅜" D x 2½" H. (40.6 x 16.2 x 6.4 cm).
Net Weight	3.2 lbs (1.5 kg).

HEATH—ZENITH

Expanding the Heath/Zenith-150

by Ted Drude

Spring has sprung, summer is around the corner, and things have been "coming up roses" for Zenith, (with another government contract under their belt). We are "blooming" here too, with lots of info for H/Z-150 users (and other PC/XT compatibles).

Tis month, we're going to be answering some questions, most of which have come from our readers mail. Among other things, we'll be looking at GW-BASIC, how to set a "border" on your color display, and PC-compatible video systems. We'll also have more info on NEC's "V" chip series and inexpensive CP/M emulation.

Correspondence Appreciated

I want to say a big "Thank You" to all who've taken the time to write in and let us know what you think about this column. I want to encourage every one of you to continue to send us your questions, comments, and opinions. Send your correspondence to: Ted Drude, c/o The *Computer Shopper*, 407 S. Washington Ave., Titusville, FL 32781.

All correspondence (post cards, letters, ASCII disk files, whatever) will be considered for publication, but we do reserve the right to edit lengthy letters. If you want a direct reply, I ask that you enclose a business-sized letter envelope SASE (self-addressed-stamped-envelope). Without the SASE, you will not receive a direct reply, but your letter will still be considered for publication. Now let's get to answering those questions.

Whither GW-BASIC?

Q. "Why can't I run IBM BASICA on my Zenith-150? Will any other versions of GW-BASIC run on the Z-150 besides Zenith's?"

F. Blaidford
Brockport, NY

A. The reason the BASICA interpreter (which comes with PC-DOS) won't run on an H/Z-150, is because it has been written so that the IBM Cassette BASIC ROM ($F0000-$F8000 in a PC), has to be present for it to run. Since only IBM has this ROM, IBM's "BASIC.EXE" and "BASICA.EXE" won't directly run on any other brand of PC-compatible.

PC-compatible manufacturers have circumvented this problem, by licensing versions of MicroSoft "GW-BASIC" which are entirely compatible with IBM's BASICA, but still run fine without the Cassette Basic ROM. (They have the key elements of the missing IBM ROM code added to the interpreter's disk file.)

As for your second question: Yes, some other versions of GW-BASIC will run on a Zenith. This includes Compaq, Leading Edge, and perhaps others. You can order the GW-BASIC interpreters separately from other manufacturers, but you will probably find that they still sell for just about the same price as Zenith's version ($100).

If you are still thinking about buying the GW-BASIC interpreter, I would recommend, instead, that you consider putting that money into a BASIC compiler. Most notably: MicroSoft's "QuickBASIC" compiler. While about the same price as the interpreter, it's a much better buy. You can also find it at discount prices from some mail order dealers.

Most programs written for GW-BASIC/BASICA will compile just fine under "QuickBASIC." In addition to being much, much faster, it's "LINKable" (allowing you to write programs in separate modules), and it extends BASIC to a higher level. In fact, it approaches Pascal with its ability to declare procedures, local variables, and so on.

Personally, I've never bothered with GW-BASIC. When I bought my Z-150, "QuickBASIC" wasn't available or I might have considered buying it. Instead, I bought the complete Turbo Pascal Compiler package, including Turbo Toolbox and Tutor, for about the same price and haven't been a bit sorry. (But that's another story!)

Setting a Color Border From DOS

Q. "I am using the Color Video Card. How can I set a color border on my screen from DOS?"

A. If you have worked with BASIC before, you probably know you can use the "COLOR" statement to set a color "border" that will surround all the text and graphics on the screen. This border (available in all but the 640x200 hi-res mode) can be one of any of the 16 text colors, although it's normally set to black, the same as the screen background color, and thus it's usually invisible.

Some users like to be able to "turn on" the border to a specific color, and leave it on all the time (without having to run a BASIC program). This provides an attractive "frame" on a color screen.

By directly poking the border color into the color card's registers, you can keep the color border in effect, (until the "video mode" or CRT controller happens to get reset). I've written a very simple machine language program (below) that does the job.

To set the border color, first decide what color you want the border and find that color's number in the BASIC programming manual (look under the "COLOR" statement). For those of you without the BASIC manual, here are the numbers associated with each color:

```
0 Black      8 Gray
1 Blue       9 Light Blue
2 Green     10 Light Green
3 Cyan      11 Light Cyan
4 Red       12 Light Red
5 Magenta   13 Light Magenta
6 Brown     14 Yellow
7 White     15 High-intensity White
```

Next, you will have to write a short machine language program, using DEBUG. This program will read in the color graphic adapter's port address (from the BIOS data area), calculate the correct "border color" address, and poke in the color number you have selected. Here is the DEBUG session that creates a progrom (called "BORDER.COM") to switch in a light blue border:

```
-a100 <---
XXXX:0100 MOV AX,000      <---
XXXX:0103 MOV DS,AX       <---
XXXX:0105 MOV DX,[0463]   <---
XXXX:0109 MOV AX,5        <---
XXXX:010C ADD DX,AX       <---
XXXX:010E MOV AL,9        <---
XXXX:0110 OUT DX,AL       <---
XXXX:0111 INT 20          <---
XXXX:0113                 <---
-rcx                      <---
CX 0000
:13                       <---
-nborder.com              <---
-w                        <---
Writing 0013 bytes
-q                        <---
```

(Note: Any line ending with a "<---" means user inputs data on this line and terminates it with a carriage return.)

If you want to change to a different border color, put the proper color number as the second operand of the "MOV AL,9" at location "XXXX:010F", above. For example, a "MOV AL,8" would create a grey border instead of a light blue one.

Juan Jimenez's V-20 Tutorial

Q. "I would like to run the V-20 tutorial by Juan Jimenez that you mentioned in your column. You said it was written in Turbo Pascal. I don't have that compiler. Can I still run the tutorial?"

A. Yes, you can. The tutorial is a compiled program in ".COM" form that will run on any true PC-compatible. I think I confused some readers by mentioning that it was written in Turbo Pascal. That fact is really irrelevant. I only mentioned it as a point of interest. The program does use graphics and color, so you will need a color adapter for it to run correctly. (But, the display you use can be monochrome.)

Basically, Juan's program is a "guided tour" of the chips on a technical level (bits, registers, etc.). He incorporates a lot of material straight out of NEC's V-20/30 User's Manual. The "interactive" approach provides a visually stimulating presentation of the "V"s features, and is more fun than just reading a plain text file. For the technically curious, it's hard to pass up (especially for free).

What About the Z-80 Hardware for the "V" Chips?

Q. "Has NEC done anything more about providing Z-80 emulation in their "V" chips? If so, when will it be available and how much?

A. The latest rumor is that NEC is making plans to deliver a V-20 type chip later this year that includes a hardware Z-80 emulation mode. A recent *PC-Tech* magazine article, said this chip is supposedly named the "V-25." It is not yet clear as whether this chip will still be 100% compatible with the 8088 or not.

Early indications are that it's hardware will have to be different due to the additional pins required for full Z-80 emulation. As soon as any additional information is available on this, I will make it public in this column. Until then, we'll just have to be content with high-speed 8080 emulation. (Sorry, but that's all I know for now.)

"V-20" Chip CP/M Emulator

Q. "Do you know if Joan Riff has an update (version of "Z80MU" yet) to run with the V-20 chip?"

Charles Waldbauer
Palm City, FL

A. As of this writing, the V-20 enhancement to "Z80MU" (Joan Riff's Public Domain software Z-80 CP/M emulator for MS-DOS), hasn't yet been released. But, there is now a "Shareware" V-20 CP/M emulator, (called "V20-80") that's starting to appear on PC-BBSs across the country.

"V20-80" is a well done (and fast) 8080 CP/M emulator that's competitive with some of the other "V" chips emulators we've looked at previously. Although not quite as elaborate as Joan Riff's "Z80MU," it does provide an inexpensive way to try out "V" chip 8-bit emulation.

(A fully registered version of the program is available from the manufacturer, US Digital, including owner's manual and updates, for only $35. You may be able to find the "trial copy" of this program on your local PC-BBS, since it has been on the Shareware "market" for several months. I also can provide copies of "V20-80" on disk for your trial use.)

Shareware/Public Domain Files Still Available on Disk

In case you can't find them on a local BBS, I'm still providing disk copies of Juan Jimenez's V-20/30 tutorial program, Joan Riff's "Z80MU" Z-80 CP/M software emulator, and several other files full of "V" chip information. The producer of the "V20-80" CP/M emulator program, US Digital, has also given me permission to include it on the same disk with these other files.

For a copy of all these files on a MS/PC-DOS 2.00 format disk, send $5.00 to this address (please make checks payable to Ted Drude): Ted Drude, P.O. Box 533, Cedar Falls, IA 50613, Attn: Zenith Disk Offer.

Understanding PC-Compatible Video Systems

Q. "I keep hearing about all kinds of confusing terms about different display systems. From IBM sources, I hear about the color adapter, mono adapter, and the EGA. How do these things relate to my Zenith's video card? What about all the third party color boards? Where do they fit in?"

A. Whew! That's quite a question. I'll try to simplify things a little. Quick run through the basics: There are four real standard video systems for PC-compatibles. The Monochrome Display Adapter (MDA), the Hercules Mono Graphic card, (Herc),

continued on page 194

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asm	conc	ferror	getdseg	iscntrl	open	repmem	strcmp
asmx	cos	fflush	getd	isdigit	outp	rewind	strcpy
atan	cpystr	fgets	putd	islower	peek	right$	strlen
atof	creat	fileno	getdate	isprint	perror	rindex	strncat
atoi	cursblk	filetrap	gettime	ispunct	poke	rmdir	strncmp
atol	curslin	find	geti	isspace	poscurs	scanf	strncpy
bdos	curscol	floor	puti	isupper	pow	setbuf	strsave
bdosx	cursrow	fopen	getkey	itoa	printf	setbufsiz	system
bios	cursoff	fprintf	getmode	keypress	putc	setcolor	tolower
biosx	curson	fputs	setmode	left$	putchar	setdate	toupper
calloc	delete	fread	gets	len	puts	settime	ungetc
ceil	drand	free	getw	log	putw	setjmp	ungetch
cfree	exec	freopen	heapsiz	log10	rand	setmem	unlink
chain	execl	fscanf	heaptrap	longjmp	read	sin	write
character	execv	fseek	hypot	lseek	readattr	sound	writechs
chdir	exit	ftell	index	malloc	reach	sprintf	xmembeg
chmod	exitmsg	fwrite	inp	alloc	writech	sqrt	xmemend
clearerr	exp	getc	insert	mathtrap	readdot	srand	xmemget
close	fabs	getch	iofilter	mid$	writedot	sscanf	xmemput
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The editor works terrific with our C compiler. The MSDOS/PCDOS version has a macro for compiling direct from memory. If your program has an error the editor positions the cursor to the error and displays an error message. You can also run other programs and execute DOS commands. Because the editor works so well with our C compiler we want to make sure you have both. For a limited time we're offering the editor for only $15 when purchased with the C compiler.

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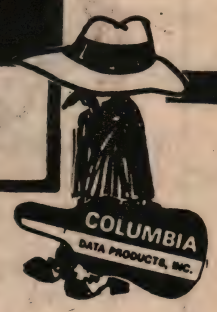
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Actually, Godfathers DIDN'T acquire Columbia, but we DID buy the assets, name, and technology and are creating a NEW Columbia Data Products, Inc. here in Florida. This new corporation will work hand-in-hand with Godfather's to provide extremely competitive products with unsurpassed quality and support.

WHAT MAKES YOU THINK THAT YOU CAN MAKE COLUMBIA SUCCESSFUL?
Columbia computers were voted first in their class last year — TWICE! First, their products were voted the most compatible and well-built PC's in the industry. Second, Columbia had the distinction of being voted the company that dealers least wanted to represent. In fact, the primary reason Columbia failed was their unfortunate lack of concern for their customers and dealers.

During the last year, however, Godfather's has become the largest "unauthorized" Columbia dealer in the nation. And if you ask anyone about doing business with Godfather's, they will probably rave about our good service and support. Godfather's has always believed that being responsive to our customers is what has made us successful. In fact, a high percentage of our business comes from other dealers who know they can depend on us to get them the answers they need . . . when they need them! They have also found that they need us less often because of our attention to detail before the sale. (For example, while most other suppliers ship their products in unopened factory cartons, Godfather's opens the box and performs testing, adjustment, and alignment of every computer, monitor, and disk drive we sell. As a result, our customers should have no problems when they receive our product.)

I think it's obvious that Columbia's reputation for quality products, coupled with Godfather's reputation for quality service and support, make an ideal team. We recognize that treating our customers, whether they are dealers or end users, the way that WE have always wanted to be treated (but seldom were) is the ONLY way we will be successful.

SO WHAT ROLE WILL GODFATHER'S ACTUALLY PLAY IN THIS TEAM?
While Godfather's will remain a separate corporation continuing in its current direction, it will provide the resources to get the new Columbia going strong. Godfather's knows how to market the Columbia products in a manner which inspires confidence in our customers. During the start-up of the new corporation, Godfather's will contribute the financial backing, purchasing, and marketing expertise to establish a strong emphasis on quality, service, and maintaining a high regard for the customer in each and every sale. We have also expanded our technical staff by adding additional software and hardware engineers to assure continued compatibility in our products.

SPEAKING OF PRODUCTS, WHAT DO YOU PLAN TO MARKET INITIALLY?
We finally have our new computer!! It is not just an "XT" or even a STANDARD "AT" . . . IT IS A SUPER "AT"!!! . . . THE COLUMBIA AT-6000!!! . . . with more of everything for those who want the best. While I don't want to cover all the details here, it does come with lots of bundled software (including MS-DOS 3.2 and BASIC, as well as a library of applications), a 20MG hard drive, 5 half-height drive slots (4 of which are user accessible), 12 expansion slots, and a 230-watt power supply. It runs all the software we have seen that runs on the IBM-AT, as well as UNIX!! UNIX does not run on many of the other compatibles we have tried. Additionally, it is fully FCC certified, stickered, AND meets all the FCC regulations!! (It's fine for some companies to offer one and two year warranties, but it won't do much good if they are not around!!)

HOW DO YOU PLAN TO MARKET THIS NEW SYSTEM?
We are planning to build a network of authorized Columbia dealers and are currently accepting applications from interested parties. We, as Columbia, are looking for organizations who are committed to providing a high level of on-site service and support, as well as an exceptional value, for end users.

I ASSUME THAT GODFATHER'S WILL BECOME YOUR FIRST DEALER?
Yes, but only in the local designated area for the Columbia AT-6000. Godfather's will NOT be selling the Columbia AT-6000 by national mail order but will be marketing ONLY through local authorized dealers. Godfather's currently has no way of meeting the requirements of providing national ON-SITE service and has decided, instead, to provide only excellent local retail service on the Columbia AT-6000. However, Godfather's IS offering a comparable product for our mail order customers . . . GODFATHER'S VIOLIN!!

WELL, I ASSUME THAT IT'S THE SAME PRODUCT, ISN'T IT?
You can assume anything you like, but I didn't say that, NOR WILL I!!! . . . and neither will you, if you know what's good for you!!!

ARE YOU PLANNING TO MARKET ANY OTHER PRODUCTS INITIALLY?
The new AT-6000 will be Columbia's only computer system at this time. We have had several requests to license the bios but aren't sure whether or not we want to share our high degree of compatibility with other manufacturers. We will be offering ROM upgrades and DOS 3.2 (or better) for existing owners of the older models, along with continued service and support for their machines. We also acquired a limited supply of several software packages, service manuals, and many odds and ends which will be sold by Godfather's.

FROM WHOM WILL EXISTING COLUMBIA OWNERS PURCHASE THE ROM & DOS UPGRADES?
Right now, all you SUPPOSED Columbia orphans can order directly from Godfather's. In the near future, we plan to form a national Columbia Owners' Association to help provide the existing owners with an economical source for upgrades and repairs. Through this Association, we will publish a periodic newsletter in which owners can exchange ideas and stay informed of new products available to them. For instance, we may have a way for existing users to speed up the Columbia and also a way to disable one of the internal serial ports so an internal modem can be installed in the 1600 model. This is just an example of some of the many ways that we can assure all those orphans out there that there IS a GODFATHER!!!

CAN PEOPLE JOIN THE OWNER'S ASSOCIATION AT THIS TIME?
While we have not yet completed all the details for the Association we do encourage anyone interested to write us. We have prepared a survey which allows prospective members to provide input on how the Association can best serve them. We will also be offering a discounted membership fee for charter members.

PLEASE CALL OR WRITE US & TELL US IF YOU WANT TO SEE MORE OF THIS TYPE AD!

WANT TO BE A DEALER? CALL US FOR INFO!!



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NEC HI-RES RGB JC 1411 P2A SUPER HI-RES *Will Not Work With 15.75 KZ Board* OUR PRICE $350 COMPARE AT $700 (RETAIL) or $440 (WHOLESALE)	NO	YES	NO	24.83 KZ	52 - 68 HZ	— Neg.	8	.31 MM	800 X 380	NO	14''
HITACHI RGB! CM 1216 SORRY! Standard NOT AVAILABLE OUR PRICE $ 600 (RETAIL) $350 (WHOLESALE)	NO	YES	YES	15.75 KZ	60 HZ	+ Pos.	16	—	640 X —	NO	12''

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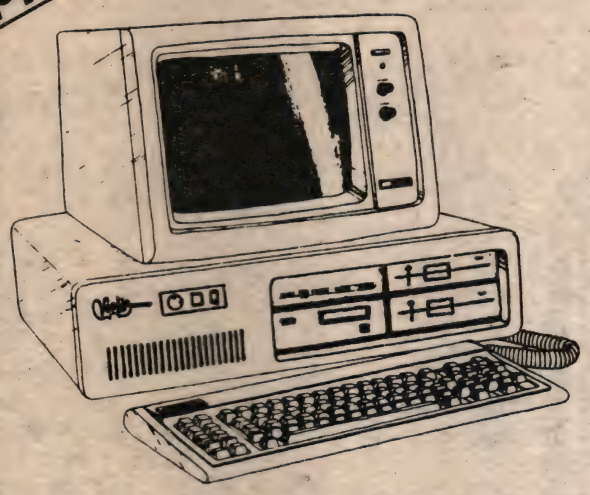
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# of Wait States (Lower is Faster)	0	0	?	?
Memory Included as Standard	512K	512K	?	?
Max Memory on Motherboard	1024K	1024K	?	?
Power Supply Watts	230	230	192	?
Manual Reset Switch	YES	YES	NO	?
AT Style Keyboard Included	YES	YES	YES	?
Parallel and Serial Ports Included	YES	YES	?	?
Runs UNIX	YES	YES	YES	?
EGA Card Compatible	YES	YES	YES	?
80287 Math Coprocessor Slot	YES	YES	YES	?
Clock Calendar	YES	YES	YES	?
2 Hard/2 Floppy Controller Included	YES	YES	YES	?
1.2 Meg or 360K Floppy Included	YES	YES	1.2	?
FCC Approved	YES	YES	YES	?
MS-DOS 3.2 Included	YES	YES	NO	?
Basic & Basica Included	YES	YES	NO	?
Huge Bundle of Software Included**	YES	YES	NO	?
Godfather's Factory Service	YES!	YES!	NO!	NO!
PRICE	$1995	$ _____	$ ___	$ ___

***Huge Bundle is available separately (without MS-DOS) for $300 for other clones!!*

Few machines can match the hardware features of the VIOLIN-AT, but they may try to do so in the future. To stay ahead of the rest we are including lots of software to this long list as it becomes available to us. Your hard drive will come already loaded and tested with most of this software, configured with an easy to use menu system so you will not have to learn MS-DOS as soon as you start. We have tested a large number of software packages and have found that the VIOLIN-AT runs all the same software as the IBM-AT that we tested.

THESE PROGRAMS ARE INCLUDED: MS-DOS 3.2 • MS-DOS tutorial • BASIC & BASICA • TIM-IV relational data base • Perfect Filer DBMS • Perfect Writer • Perfect Writer tutorial • Perfect Speller (50,000 words) • Perfect Calc spreadsheet • Perfect Calc tutorial • Fast Graphs • Perfect Link (modem program) • Home Accountant Plus • Hardware Diagnostics • menu system •

Besides these, the VIOLIN-AT runs all the popular IBM programs such as LOTUS, DBASE, AUTOCAD, WORDSTAR 2000, WORD PERFECT, and many more.

We insure your VIOLIN-AT will work reliably because of our extensive burn-in and testing. If service is required you can be assured that we will promptly repair or replace your VIOLIN-AT during your 180 day warranty. Parts and service will be available on a continuing prompt basis to serve you after that. Call before you order to confirm availability and exact configuration as prices and specifications are subject to possible change. We also will custom configure your VIOLIN-AT with reliable upgrades such as memory, monitors, EGA cards, larger or more hard drives and tape backups to maintain the quality you expect from Godfather's. I hope you are convinced that we have the best IBM-AT compatible, and for the best price anywhere.

WE ONLY BUY USED EQUIPMENT . . . UNLESS NEW COSTS LESS



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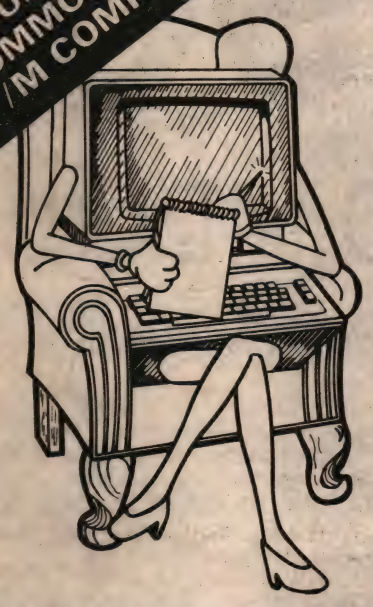
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Now, our new microcomputer version possessing the **FULL** power and range of expression of the original is available for only $45. And to let you find out how she does it (or teach her to do more), we have included the complete **SOURCE PROGRAM** (written in BASIC) at no extra charge. By making simple modifications to the Source, even a beginner can easily customize ELIZA's responses. You can even make a simple change that will enable ELIZA to converse with you through a speech synthesizer!

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"Much more than a mere game...You'll be impressed with ELIZA...A convincing demonstration of Artificial Intelligence." —**PC MAGAZINE**

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Atron PC Probe
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Finally, most hardware debuggers (and some software debuggers, as well) have a trace feature. During program execution, a given number of instructions are stored in a que. Whenever program execution is terminated, either by breakpoint or through the use of the breakout switch, you may then examine the previous steps stored in memory. This is particularly useful for answering the often asked question, "How did I get to this point?"

Compatibilities

The current version of PC Probe currently supports the following software:

Computer Innovations C
IBM Pascal
IBM Assembler
IBM PC-DOS Version 2.0 and above
Intel PLM
Intel Assembler
Lattice C
Microsoft C
Microsoft Pascal
Microsoft Fortran
Microsoft Assembler
Microsoft MS-DOS Version 2.0 and above

Current computer systems supported by Atron's PC Probe include:

Compaq PC
Faraday Board based machines
IBM PC
IBM XT
Leading Edge
NCR PC
Sperry PC
Tandy 1200
Zenith 150
Zenith 151

Installation

While the actual installation of the PC Probe is fairly straightforward, it's not without apprehensive moments. Since the debugger requires real time logic in order to operate, it draws its information from the heart of the computer itself—the CPU.

Atron includes a small 8088 extraction tool designed to pry the central processor out of the motherboard without damage to either the board or the chip. Once the 8088 has been removed from the motherboard it is reinserted into a special connector which in turn is plugged back into the motherboard.

The purpose of this connector is that it extends the logic lines from the CPU in a parallel fashion into an additional ribbon connector. An insulated ribbon cable is then used to connect these logic lines directly into the Probe.

The Probe itself is a full length card that requires a single full length slot on the motherboard. On the rear of the card are two connectors; one is used for an external breakout switch which uses a modular jack identical to the type used in residential telephone systems. The other jack can be used to connect an external terminal to the system which can be used simultaneously with the PC's monitor.

Since the PC Probe contains 128K of RAM memory, the starting address of the memory must be configured using jumpers on the Probe itself. Atron sets the Probes to a default area of D000 which should not conflict with any other devices normally supplied for the PC.

Once the memory configuration is completed, the full length board is installed and the umbilical cord from the CPU is attached. From the modular connector on the rear of the card you connect the external breakout switch and place it beside your keyboard.

After the installation is complete, the hardware may be checked with a factory supplied diagnostic program. After passing its tests you're ready to close up your system and read the rest of the manual!

The Manual

I don't think any review of Atron's products would be fair without first mentioning that the documentation accompanying the Probe is inadequate. While sections relating to most of the hardware aspects of the Probe are commensurate with its sophistication, the chapter describing the intricacies of the command set are laeking.

Most serious programmers using the PC family become

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Atron PC Probe continued from page 98

familiar with either DEBUG (PC-DOS debugging program) or SYMDEB (Microsoft's symbolic debugging program). Both of these programs use identical command structures to each other, although SYMDEB has additional extensions to cover features not supported under DEBUG. Even Periscope, another advanced symbolic debugger, choose to maintain compatible commands.

PC Probes commands are totally different than either DEBUG, SYMDEB or Periscope. This uniqueness causes the user to learn the debugger from scratch. Unfortunately, the documentation is often vague and lacks examples of the syntax required to perform some of the operations.

The Software

While Atron's PC Probe is called a hardware debugger, it would be more appropriate to say that Probe is a hardware assisted debugging package. PC Probe requires additional software which must be run prior to invoking the debugger.

Included with the basic system is software which supports the 8086 instruction set. If you wish to work with the 8087, additional software must be purchased which extend the debuggers instruction set. Since the PC Probe is designed to work in the PC or XT system, Probe will not support 80286 extended functions. The software a la carte pricing can effectively raise the price of the debugger by several hundred dollars.

In addition to software required to operate the debugger, PC Probe contains several utility programs. As already mentioned, Probe contains a diagnostic utility which tests the integrity of the electronics as well as the installation configuration. Other utilities on the diskette are primarily aimed at adapting symbol files from various languages and compilers into the format required by Probe for symbolic debugging.

Symbols

PC Probe enables the programmer to refer to various addresses in memory through the use of symbols or labels as opposed to absolute addresses or values. These symbols consist of public variables, public procedures, functions, subroutines, module names and in some cases line numbers. The symbols are made available to the debugger via the link program. When certain options are specified at compile and link time, the linker produces "map files." Basically, all the map files consist of are symbols and their corresponding address. When the debugger refers to any value possessing one of these values, it substitutes the symbol name for the value.

When working with Lattice C, Microsoft or Computer Innovations C compilers, optional line numbers may be included into these files for further assistance to the programmer.

Most commands used by the PC Probe permit the programmer to use these symbols in lieu of absolute addresses or values.

The Command Set

In order to appreciate the thoroughness and potential of the PC Probe I've listed the debuggers command set below. As you'll discover, hardware debuggers do a far greater job in monitoring certain hardware conditions like DMA than their software counterparts.

Quite frankly, I was somewhat overwhelmed by several of PC Probes features; it took me a very short time to discover that the debugger was far more capable than the reviewer! Unfortunately, the manual accompanying the program assumes you understand the purpose of each command as well as its significance. Hopefully, future revisions to the manual will include some form of tutorial information.

Here is a quick listing of the features of Atron's PC Probe:

ASSEMBLE:Instructions in 8088 assembly language mnemonics can be entered into memory.

ASSIGN:Assign a filespec to a module name for use in single step trace and edit commands.

BREAKPOINT:Define or display sticky breakpoints.

BYTE:Displays or changes the bytes in memory.

COMPARE:Contents of two blocks of memory are compared.

CONSOLE:Console input/output can be directed to either the PC monitor and keyboard, the RS-232 port on the Probe, COM1 or COM2.

DELETE:Deletes symbols, macros or breakpoints.

DIR:Displays the files in a directory.

DMA:Display DMA cycles during a trace.

ECHO:Display of commands during macro execution can be toggled off and on.

EDIT:Allows manipulation of files or trace data with the ability to log changes.

EVALUATE:Expressions or pointers translated into different number bases.

FILL:Fills a range of

continued on page 101

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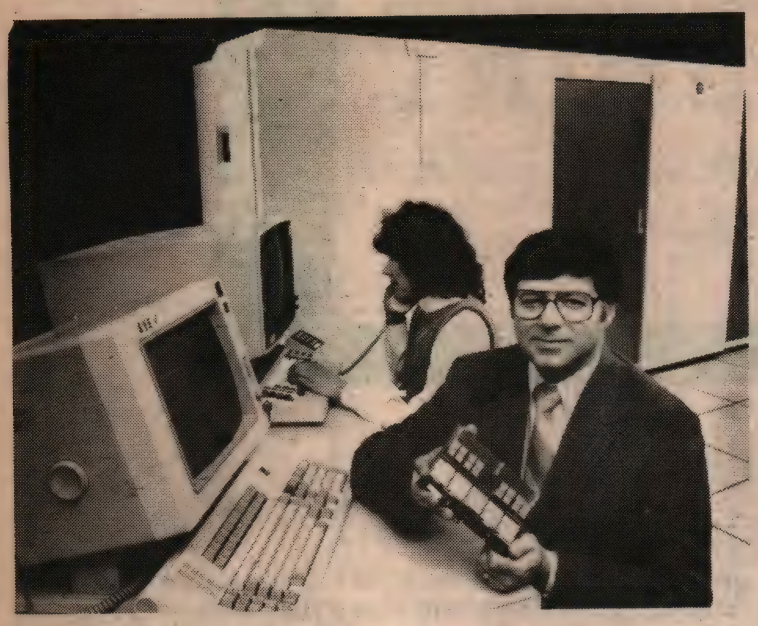
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IBM's New One-Million-Bit Chips



IBM Megabyte Memory

IBM announced recently it is shipping high-end 3090-series computers with IBM-developed and -manufactured one-million-bit chips in central storage. IBM was the first company to begin volume production of one-million-bit memory chips and is the first to include these chips in mainframe computer products.

"With the announcement of the megabit chip, 3090 technology continues to unfold. This is the latest example of the technical enhancements that make the 3090 our high-end growth system for the decade," said Jack D. Kuehler, IBM senior vice president who heads the company's development and manufacturing activities.

"Historically, our goal has been to help customers increase computing power in an orderly way," he added, "and our 3090 efforts demonstrate that commitment."

This week IBM began shipping one-million-bit memory technology in all 3090 models for increments of central storage in excess of 32 million characters. The new technology also will be used for central storage upgrades. For example, a customer planning to upgrade a model 150 or a model 180 from 32 megabytes to 64 megabytes of central storage will receive one megabit technology.

IBM said several 3090s with the new memory technology have been running a variety of applications as a field test within the company and in several customer locations since the fourth quarter of last year.

Each megabit chip can contain slightly more than one million "bits" — 1,048,576 binary 0s and 1s — of computer data, enough to store approximately 100 pages of double-spaced typewritten

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New Release Of Paradox Database Application, Generator

Ansa Software has announced version 1.1 of Paradox, its relational database. Release 1.1 incorporates a number of major enhancements over the previous version, including automatic multiple-file data-entry capabilities, the removal of copy protection and an application generator. Ansa Software will make the Paradox 1.1 update available free to all Paradox owners who are registered as of March 17, 1986.

Release 1.1

Like the previous version of Paradox, Release 1.1 is a relational database management program that runs on the IBM family of personal computers and 100-percent compatibles, such as Compaq. Paradox serves the full range of user application needs--from the first-time user to the sophisticated database developer. Included among its features are a familiar Lotus 1-2-3 like interface and a powerful programming language.

Release 1.1 provides several important enhancements for Paradox users. These include an easier multiple-file update capability, a runtime version, the removal of copy protection, an application generator, new PAL (Paradox Application Language) commands that speed up execution and access to DOS.

The multiple-table update facility enables users to add or revise data in two or more files (or "tables") at once from a single form. This greatly enhances the database's extensive data entry and multiple file manipulation capabilities.

Paradox Runtime, an abridged version of Paradox, gives developers a cost-effective way to distribute their application-specific Paradox programs. Registered Paradox users can obtain a single copy of Paradox Runtime for the nominal handling charge of $9.95 by completing an order form included with each copy of Paradox 1.1. The developer can then copy Runtime up to 250 times for distribution with custom applications.

The full-featured application generator enables users to quickly create sophisticated database programs without

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Atron PC Probe
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memory locations with values in a list.

FLAGS:Displays or changes CPU flags.

GO:Executes the program being debugged and stops execution when a specified breakpoint occurs.

IF:Allows conditional execution of macro commands.

INITIALIZE:Restores all conditions of EXE files to a state prior to program execution.

INTERRUPT:Enable or disable interrupt levels at the 8259 upon entry to Probe from a breakpoint.

LIST:List all of Probes output to the designated file or device.

LOAD:Load application programs, symbol tables or macros.

LOGIC:Changes the heading for logic signals in the display of the trace command.

LOOP:Command sequence loops can be executed within a macro.

MACRO COMMANDS: User commands can be created through the definition of macros. These macros can be saved and included in future debugging sessions.

MENU:Enables or disables the display of the command set from the menu window.

MODULE:Assigns the current default module name prefix for line numbers in the symbol table.

MORE:Displays alternate fields of commands in the prompt window.

MOVE:Move a block of memory to a new location.

NEST:Display the calling sequence of procedures.

NOBREAK:Disables the termination of execution when certain breakpoint conditions are encountered.

NOVERIFY:Enables or disables the read after write verification for certain commands.

PORT:Displays or modifies the contents of an IO port.

PRINT:Print formatted information to the console.

POINTER:Display or change 32 bit pointer in memory.

QUIT:Terminates Probe execution and returns to operating system.

REGISTERS:Displays or changes CPU registers.

SAVE:Macros or blocks of memory can be saved into a file.

SCREEN:Screen switching isolates the application screen from Probes screen by creating two virtual screens.

SEARCH:Searches blocks of memory for a list of characters.

SELECT:Limits the number of loaded line numbers from the MAP file into Probes symbol table.

SOURCE STEP:Performs single step program execution at source code level.

STEP:Single step program execution as the assembly level.

SYMBOL:Defines or displays the values of the symbols which were loaded into the internal symbol table space.

TRACE:Displays information stored by Probe during real time program execution.

UNASSEMBLE:Unassembles memory into 8088 assembly language instructions.

WINDOW:Opens a window to display user defined data after each go, step, or source step command.

WORD:displays or changes a word in memory.

Conclusion

Hardware debuggers share a very limited consumer market if for no other reason than price itself. Most midnight hackers simply can't afford programming tools more expensive than their machines themselves.

Professional software engineers, on the other hand, cannot afford to be without tools like the Atron PC Probe. As the complexity of application programs increases, tools such as these provide a competitive edge by enabling them to produce far more debugged

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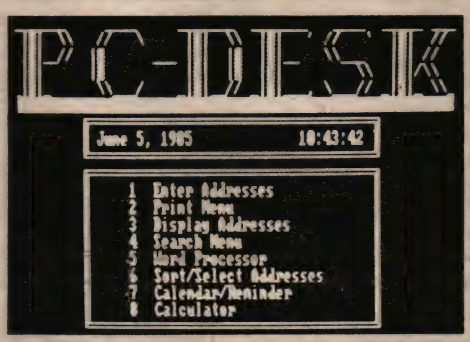
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Screen-Save

A Screen Dump Utility

by Andrew M. Fried

Some time ago, I needed a tool which would enable me to quickly capture screens of text and import it into my Wordstar documents. Realizing that programs such as Multiple Choice and Sidekick have facilities to perform this task, I attempted using those programs but discovered so many limitations that I chose to write my own.

What I ended up with is so useful that I wanted to share it with our readers. Aside from the actual utility itself, it's a good demonstration of how to redirect interrupt vectors, create a terminate-and-remain resident utility, write interrupt handlers, convert binary values into ASCII, use ROM BIOS to determine the equipment configuration and how to work with low level disk I/O. All of this from one little program!

While the source code is heavily commented, I have taken each section and listed it below along with a comment describing the purpose of each section. This information, when combined with the comments found in the source code itself, should serve as a good template should you wish to create your own interrupt handlers.

I hope you enjoy using Screen-Save!

save__regs

When an interrupt occurs, the operating system pushes certain information onto the stack. Furthermore, all subsequent hardware interrupts are disabled. Most interrupt handlers reset the interrupt flag so subsequent interrupts can occur. This section turns on the interrupts.

Since interrupt handlers must restore all registers before returning from the interrupt, the second step is to push all of the registers onto the stack.

To prevent the PrtScr interrupt from occurring while we are actually performing the interrupt (remember, we already turned the interrupts back on!), a flag is checked to see if the routine is already in progress. If so, the interrupt jumps to the end and aborts.

set__flag

If, after entry into the interrupt handler, we discover that the handler is not already in progress, we set the flag mentioned above. From this point on, any subsequent PrtScr interrupts will be ignored.

get__screen__seg

Since the Screen-Save utility works directly with memory mapping, it must know whether or not the video memory active at the time of

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Atron PC Probe

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code in shorter periods of time. When you calculate the programmer's time savings, the Atron products pay for themselves in a matter of months.

I did discover one thing, and that is that if you like to work with someone else's existing code (creating patches, etc), the Atron falls far behind an advanced software debugger like Periscope. Software debuggers usually offer many more breakpoint options than hardware debuggers do and these are necessary when looking for obscure code in a large program. Hardware debuggers, on the other hand, rely heavily on symbols created by the linker which are unavailable to the person working with existing code.

My only complaint against the PC Probe dealt with its documentation and not the product itself. Geoff Alexander, a sales representative at Atron, advised me that their manual is currently being rewritten and assures me that the next revision should quell all customer complaints concerning it.

The Atron Probe and its accompanying software was bulletproof, fast (how much faster can you get than real time???), and fully featured. Hardware debugging configuration for PCs run around $1600 while units for ATs cost around $2500. Furthermore, factory support is only a phone call away.

If you're programming in the big leagues using either C or assembly, the Atron probe should be one of your top three tools; preceded only by your computer and the assembler! For hackers with limited funds such as myself, I guess we'll have to remain content with DEBUG and Perisocpe...

For additional information contact:

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Print speed (cps): draft, NLQ		100,25	160,40	100,16	100,20/120,22/180,33	120,30
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ACCESSORIES

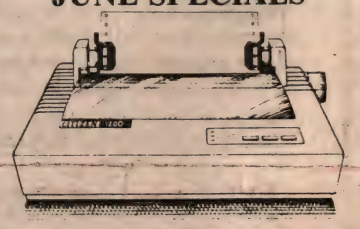
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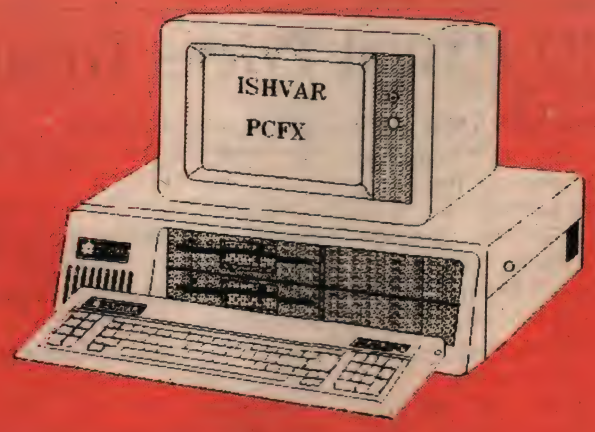
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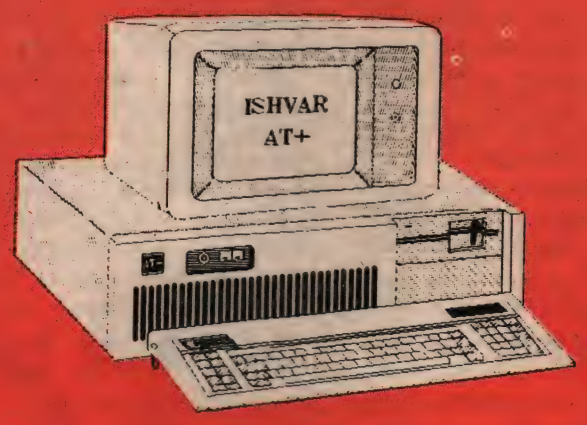
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* Over 95% of this ad has been type-set & printed using the LePrint software and a Citizen MSP-10 printer on the AT+. (Copy was reduced slightly)





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Screen-Save continued from page 102

a screen dump is color or monochrome. In order to determine this, a ROM BIOS call is used to determine the current video mode. If the system is in color mode, the video segment is set to B800; otherwise it is set to B000. *Note: that EGA, which begins at C000, is not supported by the current version of Screen-Save.* Program on page 108.

fill__buffer

When you are in text mode, each location of the screen requires two bytes (or one "word") of storage; one byte stores the actual character while the other stores the attribute. This section loads in a word and send only the character byte into the buffer. Since the standard screen contains 80 columns and 25 lines, the buffer must hold 2000 characters.

One problem will surface however, since merely storing the text in this manner results in "strings" of 2000 characters. Most text editors and word processors cannot handle lines in excess of 255 characters (a DOS limitation when using certain ROM BIOS and DOS function calls). In order to correct that situation, Screen-Save automatically includes an additional CR/LF combination at the end of each screen line. These additional characters bring the total file size for each screen up to 2050 bytes.

save__screen

Once the 2050 bytes are in memory, the next logical step would be to save it to disk. This section performs just that function. To start off, I disable all hardware interrupts so the ROM BIOS disk interrupt isn't disturbed. Then, using a given file-name already existing in memory, the screen contents are sent to a file.

If you look closely, you'll notice that I didn't write the last two characters, which are nothing more than a CR/LF byte combination, to the file. When I first wrote the program, a friend of mine reminded me that 2048 bytes generally fill up a cluster but the other two bytes cause it to overflow and tie up an entire cluster. To make him happy, I conserved space and wrote only the first 2048 locations to disk.

inc__scr__num

When Screen-Save is first run, it initializes certain fields automatically. The files used to store each screen always carry the prefix "Screen." The extension, however, changes each time a screen is saved. The initial extension begins with "000."

This gives the program the capability of capturing up to 1000 screens of data each time the program is run. In order to consecutively number these files, a counter is maintained in memory. After each print screen interrupt occurs, this counter is incremented.

update__name

After the screen counter is incremented, the file extension, which consists of three ASCII characters, must be updated to reflect the new number. This section translates the binary number into an ASCII string. This string will then be used as the file extension for the next screen dump.

reset__flag

Now that the screen has been captured, stored, and written to disk, we have one last piece of housekeeping left before we restore the registers and exit the handler. Remember the flag we checked to see if the Screen-Save was already in progress? Well, we have to reset it so additional calls can be made to the handler.

restore__regs

Finally, we restore all of the registers back to their initial state and ensure the interrupt return command.

bootstrap

This section is the one responsible for initially loading the program, resetting the interrupt vectors, initializes the "busy" and "scr__num" flags and issuing the terminate but remain resident command. This section is documented well enough to be self-explanatory.

For Non-programmers

If you don't own an assembler or don't care to type the program in, I'll send you the program in both ASM as well as COM form for the small sum of $10. This includes the diskette and mailer, postage, program and source code.

What a bargain! Send the check or cash to:

Andrew M. Fried, 895 Cynthia Drive, Titusville, Fl. 32780. ●

UCSD Pascal Prices Drop

UCSD Pascal with 8087 support and BCD is now available for $79.95 from the Brooklyn firm of Pecan Software Systems, Inc., which marketed the same package for $150.

The current UCSD Pascal release, which includes dynamic memory management, separate compilation, data hiding, multitasking and native code generation, runs under PCDOS, MSDOS and other operating systems, and on Amiga, Apple, Atari, Macintosh, Rainbow and Tandy as well as most 8/16/32 bit computers.

Announcing the price change, Pecan Vice President Eli Willner stated that the firm is also marketing a professional package that includes UCSD Pascal, configuration tools, symbolic debugger, application services interface, program analysis toolkit, disk recovery toolkit and print spooler for $179.95.

Willner stated that "the education market will be very interested in our special educational pricing structure and our strong user support. The language was originally designed to be used in an educational environment. We offer complete and standard implementations of Pascal with many computer science extensions."

According to Willner, the firm has a variety of plans for the education market that include finished product and site licensing arrangements so that institutions can choose the most useful plan for their needs.

For additional information contact Pecan Software Systems, Inc., 1410 39th Street, Brooklyn, NY 11218; (718) 851-3100.

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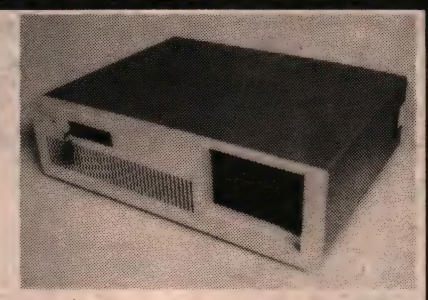




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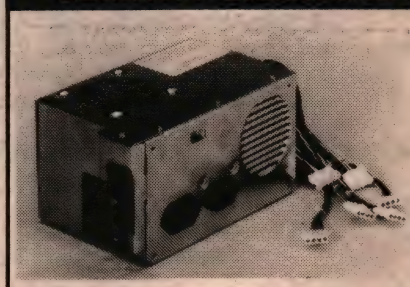
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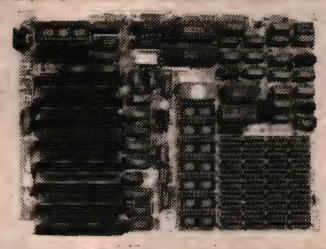
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Guru Integrated Software continued from page 64

and assembler and it runs a lot faster than I thought it would when I first started with the package. By the time you are finished with the demonstration your appetite will be sharpened for more.

The program uses the artificial intelligence environment to blend three basic capabilities:

Information manager—data base management, spreadsheet, text processing and graphics.

Expert System Shell—used to build rule based expert systems. These systems are designed to solve problems similar to the way a human expert would. This is made possible by a set of rules stored in the system. To me these are like "If then statements" that can be developed to fit particular applications by the operator.

Natural Language—to query the information manager and initiate expert system consultations using plain English! Using the existing dictionary as a base, new words can be added as needed. If GURU doesn't understand the inquiry it will request clarification.

One of the most striking aspects of GURU is the menu system. I would hate to have to count the number (well over 500) of menus available for use by the operator. Every area of GURU is available by menus that lead you step-by-step through the process. Each menu leads to others and as you select a command from a menu it is displayed across the bottom of the screen. As you use several menus in a row they are displayed stacked like a deck of cards with the top line of each visible above the menus on the top of it so you always know where you are, making back tracking a simple process of selecting "Previous Menu" until you are where you want to be. Everything that is accomplished by using the menus can also be done by using the Commands without entering the menus.

Data Base Management

The Data Base Management capabilities are LARGE! An unlimited number of tables that can have 2,137,483,647 records per table with up to 65,535 characters per record. Each record can contain up to 255 fields each having up to 65,535 characters. A table can have an unlimited number of indexes that can have a maximum key length of 65,535 characters. Any number of tables can be opened at one time.

Structuring a Table for the DBM is not hard. Select "Table Structuring" from the menu. Follow this with "Build New Structure" and you will be asked to name the table with a file name. From that point it is much the same as setting up any data base. Field names, labels (an option to allow a more detailed description of the field), types (string, decimal, whole number or logic) and field picture (another option that structures the data entered such as "dd/dd/dd" for a date field). Once you have finished defining or structuring a table it will appear on the menu of available tables for the data base.

A structured table can be displayed, modified or deleted from menu selections. Fields can be added, modified or deleted from the menu. The table can be used for data entry once it is defined. This too is done from menu selection. The fields are displayed in order waiting for data entry. Once records are entered they can be manipulated, again by menu selection. Data can be viewed individually or selected by establishing "conditions" that determine which records are to be displayed.

Figures 1 through 8 follow through the entire menu process of setting up the structure of a table. Each menu option is accompanied by the HELP window (over 400 pages on line) that is called up when yo need it by using "CONTROL L". I've included it for two reasons, first so you can see the amount of help available should you need it and second because my screen dump was reacting to part of the screens and printing blank lines without the help window. The help window comes up for whatever selection you have highlighted on the screen. The highlighting doesn't show in the screen dumps.

At first you will use the menu structure for what it is worth. As you get to know your way around GURU you will take short cuts to eliminate time used to call up all the various screens. GURU will function as you want it to, at your level of expertise. This holds true for all areas of GURU.

Spreadsheet

The spreadsheet operates much the same as others. It has the capability to hold 65,535 cells and 255 windows per sheet. The "What-if" analysis function is similar to those that are used in other sheets. GURU's integration with the other features, data base, programming language, expert system consultation, and more—gives it tremendous flexibility. Data is easily transported to and from other GURU tables, external files or from 1-2-3 spreadsheets.

Set up is menu driven like the data base. Following the chain of menus takes you through a complete set up without any fuss. I was able to set up a sheet easier than the first few times I used the old reliable VisiCalc. Detail is fantastic, right down to selections to set the foreground and background colors.

Outside of the integration and the menu driven set up GURU's spreadsheet might be any one of several others on the market. You won't have any problems with it.

Text Processing

GURU uses the term "text processor" rather than word processor. It is very flexible but, to me, the most cumbersome part of the program. The complexity is necessary, due to

continued on page 198

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● CRYPKAS: KASISKI Analysis. Salient features include appending any number of follow-on chars. to each n-gram Find to reveal larger n-grams; and the factoring of each Find displacement value into its primes to quickly reveal common primes, thus key lengths. Optional Shell-Sort of n-gram Finds.

● PRIMES: Generates up-to 1,000,000 primes for use here, with "public key" ciphers, etc.

Each program is completely described with sample results and attack methods. A detailed, completely worked out example is given. Completely labeled printed results. Although no known method of attack will decrypt our $1,000 Ciphertext (see above), these powerful programs provide added clues. Not only powerful tools to decrypt the ciphers of others, they can also test the strength of YOUR CIPHERS. And they can be used to develop data compression methods - increase data entry sizes and memory storage efficiency! Tables include detailed 1-, 2- and 3-gram statistics of typical text. Includes reviews of cryptanalysis books.

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● Thorough analysis of why computer crimes are the least risky and most profitable of all crimes.

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Edit Text And Fonts With One Integrated Program

Horstmann's Inexpensive Chiwriter

by Hal Nieburg

Would you like to customize the IBM extended character set for all those languages that IBM forgot? Chinese pictographs, Czech or Turkish diacritical marks, Arabic script, written Cherokee? Like this in Turk? (See Figure 1)

Or perhaps you need to create your own character set from scratch, like this? (See Figure 2)

Want to enter complex math formulae in the middle of a page of text, like this? (See Figure 3) Draw simple charts without exiting from the word processor?

Create multi-tiered super and subscripts? And change fonts easily whenever you feel like it, like this? (See Figure 4)

Turn your ancient dot matrix printer into the best Near-Letter-Quality printer I've seen?

And see all the different fonts immediately displayed on the screen, exactly as they will be printed to the page? And without changing a single DIP switch on the Epson (or compatible dot matrix)?

Now all that and more is possible with a wonderful package from Horstmann Software Design, P.O. Box 4544, Ann Arbor, MI 48106; (313) 663-4049. Chiwriter (including a complete manual) is priced at the bargain rate of $69.95. The latest version is 1.31. It supports the Toshiba 1340 and the Hercules monochrome graphics board are $19.95 each. As if that wasn't cheap enough, the program is also available as "freeware," which Cay Horstmann, tongue firmly in cheek, calls "PIRATEWARE." The PIRATEWARE disk containing the Chiwriter program (modified to display a "commercial message" at startup) and a short manual, but without the font designer, can be ordered for $4.95 + $5.00 shipping an handling. You can make as many copies of that disk as you like and share it with others.

Chiwriter is a "what-you-see-is-what-you-get" word processor allowing editing with multiple fonts and super/subscripts right on the screen. Ten fonts (almost 1,000 characters) and 250 levels of super and subscripts per line are supported. Chiwriter is perfect for any editing job requiring frequent font changes, tables and formulas.

It is easy to learn and use. If you already know how to use a standard word processor like WordStar, you can start working with Chiwriter in under one hour.

Currently the following printers are supported: Epson MX/FX 80 and compatible, Epson LQ 1500, Okidata ML 92/192, C.Itoh 8520 Prowriter and Toshiba 1340. Chiwriter runs under DOS 1.0 and up; under DOS 2.xx and 3.xx, tree-structured directories are fully supported.

The following fonts come with it, and of course you can add your own: (See Figure 5 on page 109)

The Chiwriter Editor

This system comes set up for the IBM Graphics board and the Epson MX 80 or compatible printer. Chiwriter does not work with a monochrome board. To start the editor, type:

CW <filename>

The deault filename extension is .CHI. The default drive is A:. If you need to override these defaults, specify explicit extension, drive and path names. You should go through the lesson on TUTORIAL.CHI to become acquainted with the editing commands. Only the commands essential to get you started are introduced there.

The word processor component is a sleek, fast, and highly implemented product. Block editing, copying to-and-from buffer, import and export of ASCII and Chiwriter files, rapid cursor movements, pagination and re-pagination, visible soft page breaks, and most of the conveniences we have come to expect are pro-

continued on page 109

Figure 1

abcçdefgğhıijklmnoöprsştuüvyz
abcçdefgğhıijklmnoöprsştuüvyz
abccdefgğhıijklmnoöprsştuüvyz
abccdefgğhıijklmnoöprsştuüvyz

Figure 2

ISN'T THIS A PRETTY FONT?

Figure 3

$$\frac{1}{\sigma\sqrt{2\pi}} \int_{-\infty}^{\infty} \exp\left[-\frac{(x-\mu)^2}{2\sigma^2}\right] dx = 1$$

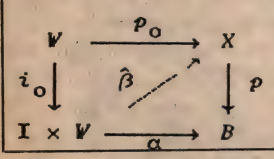


Figure 1

Figure 4

This is an example of *changing fonts* whenever you feel like it! Ανό ος χουτινυς ιν ίρεεχ. Øə ſs ⊕ ⊏⊐ƨØ⊂ø• ∈ ⊐ØſU ⊕ƨ∈ ⊻⊄$ ⊔Ø⊕N ⊂∪⊇⊓⊄⟨⟩ ⊇⊼⊢× ⊢⊲⊲⊃⊕⊓⊿⊔ AND WHAT IS THIS? THIS IS SMALL, ALL CAPS. *AND SO ON* and on and on and on.

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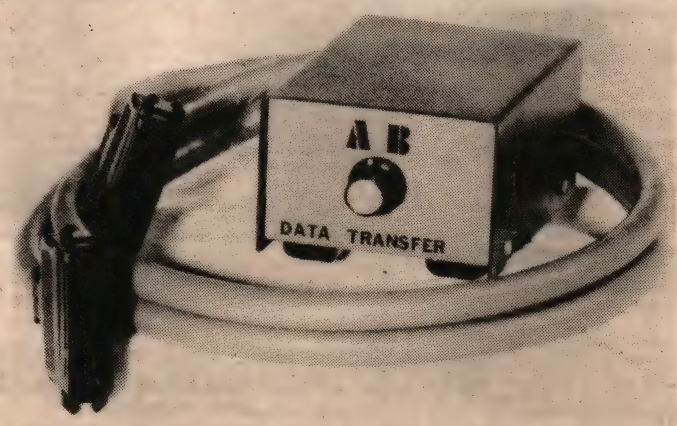
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Screen Save Program

Screen-Save continued from page 104

```
cseg segment para 'code'
handler proc far
                assume cs:cseg          ; set proper segment values
                org 100h                ; necessary so we can make it a com file

; these public declarations are primarily used by my symbolic debugger. it
; loads these values into the map file which is in turn loaded by the debugger

public  handler, start, copyright, busy, scr_num, video_seg, screen_buffer
public  filename, file_ext, int_handler, save_regs, set_flag, get_screen_seg
public  j1, fill_buffer, next, continue, save_screen, inc_scr_num, j2
public  update_name, reset_flag, exit, restore_regs, bootstrap


start:
                jmp bootstrap           ; jump around the data declaration

copyright       db '                                        ',13,10
                db '          SCREEN-SAVE                   ',13,10
                db '                                        ',13,10
                db '   (C) Copyright 1986 by Andrew M. Fried',13,10
                db '                                        ',13,10
                db '     Use PrtSc to save screen to file',13,10,10,'$'


busy            db 0                    ; snapshot in progress flag
scr_num         dw 0                    ; number of pictures taken of the screen
video_seg       dw ?                    ; segment of current video mode
screen_buffer   db 2050 dup (?)         ; temporary screen buffer
filename        db 'SCREEN.'            ; the file pathstring less extension
file_ext        db '000',0              ; the file extension in asciiz format

int_handler:
save_regs:      sti                     ; enable interrupts
                push ax                 ; save most of the cpu registers
                push bx
                push cx
                push dx
                push ds
                push es
                push si
                push di

                push cs                 ; temporarily push cs on stack
                pop ds                  ; now pop it off and place in ds
                cmp busy,0              ; is busy flag set?
                je set_flag             ; no, then continue on
                jmp exit                ; otherwise exit using far jump

set_flag:                               ; sets flag to indicate prtscr active
                mov busy,1              ; 1 = busy  0 = free

get_screen_seg:                         ; find active screen segment
                int 11h                 ; rom-bios call gets us the equip config
                and ax,48               ; mask off unnecessary bits
                cmp al,48               ; bits 4 & 5 set indicate monochrome
                je j1                   ; its a monochrome system
                mov video_seg,0B800h    ; place the video seg into memory
                jmp fill_buffer         ; skip the monochrome initialization
j1:             mov video_seg,0B000h    ; place monochrome segment into memory

fill_buffer:                            ; move screen characters into buffer
                xor dx,dx               ; register used to count for eol
                mov bx,video_seg        ; get the source segment
                mov ds,bx               ; and place it into the data segment
                mov bx,cs               ; get code segment
                mov es,bx               ; and place it into the extra segment
                xor bx,bx               ; clear bx
                mov si,bx               ; and place offset into video_seg
                lea di,screen_buffer    ; get the offset of our internal buffer
                mov cx,2000             ; enter the number of screen locations
next:           mov ax,[si]             ; get word pointed to by si
                mov es:[di],al          ; and store in buffer pointed at by di
                inc si                  ; increment the source index
                inc si                  ; twice since we're looking at words
                inc di                  ; increment the destination index
                inc dx                  ; count characters per line
                cmp dx,80               ; have we gone to the eol on screen?
                jne continue            ; if not jump around code to add cr-lf
                mov byte ptr es:[di],13 ; add a carriage return
                inc di                  ; point to next space
                mov byte ptr es:[di],10 ; add a linefeed
                inc di                  ; point to next space
                xor dx,dx               ; reset dx register
continue:       loop next               ; go back and get next set of values

save_screen:                            ; creates file and uses dma transfer
                cli                     ; shut down hardware interrupts
                mov ah,3Ch              ; create a file dos request
                xor cx,cx               ; set zero attribute
                mov bx,cs               ; get code segment
                mov ds,bx               ; and place it into ds
                lea dx,filename         ; point to file name
                int 21h                 ; use dos function call to create file
                jc exit                 ; exit if an error occured
                mov bx,ax               ; store file handle
                mov ah,40h              ; write to file request
                mov cx,2050             ; set the number of bytes to save
                mov dx,cs               ; load the data segment
                mov ds,dx               ; and place it into ds
                lea dx,screen_buffer    ; get the screen buffer address
                int 21h                 ; now lets save it all
                mov ah,3Eh              ; close file regardless of err level
                int 21h                 ; use dos function to close file
                sti                     ; turn hardware interrupts back on

inc_scr_num:                            ; section counts number of snapshots
                mov ax,scr_num          ; get current screen number
                inc ax                  ; increment the count for next screen
                cmp ax,1000             ; have we exceeded our max count?
                jne j2                  ; jump around counter reset if less
                xor ax,ax               ; otherwise reset the counter
j2:             mov scr_num,ax          ; save the screen value back

update_name:                            ; update the file extension with number
                cmp ax,0                ; make sure we don't divide by zero
                je reset_flag           ; if equal continue to next procedure
                lea di,file_ext         ; point to hundreds position
                mov cl,100              ; lets get hundreds first
                idiv cl                 ; divide ax by cx to give us hundreds
                add al,'0'              ; get the number in ascii format
                mov [di],al             ; move character into first position
                inc di                  ; point to tens position
                xchg ah,al              ; place remainder back into al
                xor ah,ah               ; clear out ah
                mov cl,10               ; ready to get tens in remainder
                idiv cl                 ; leaves tens in al and one in ah
                add al,'0'              ; get ascii value for tens
                mov [di],al             ; place tens in position
                inc di                  ; point to ones position
                add ah,'0'              ; convert ones into ascii
                mov [di],ah             ; place ones in position

reset_flag:                             ; sets flag to indicate prtscr done
                mov busy,0              ; initialize flag to zero

exit:
restore_regs:                           ; put the system back the way it was
                pop di                  ; restore all of the cpu registers
                pop si
                pop es
                pop ds
                pop dx
                pop cx
                pop bx
                pop ax
                iret                    ; return from interrupt


bootstrap:                              ; beginning of the bootstrap loader

                ; begin the bootstrap loader by setting the border color to
                ; match the screen color which is dark blue with white letters

                mov ah,11               ; set up request to change border
                mov bx,0001h            ; lets make the border blue
                int 10h                 ; rom bios will do it for us



                ; this section clears the screen and sets the screen attribute
                ; to blue background with white character

                mov ax,600h             ; scroll entire screen up
                xor cx,cx               ; set upper row and column to 0
                mov dh,24               ; last row of window
                mov dl,79               ; last column of window
                mov bh,31               ; video attribute byte for window
                int 10h                 ; clear screen



                ; now the cursor needs to be positioned in the upper left hand
                ; corner of the screen

                mov ah,2                ; set cursor position request
                sub bh,bh               ; use page number 0
                sub dx,dx               ; set to row 0, column zero
                int 10h                 ; use rom-bios to set cursor



                ; like all good software, you must print a copyright notice
                ; suggested even for personal software

                mov ax,cs               ; get code segment
                mov ds,ax               ; and place it in ds
                lea dx,copyright        ; get copyright notice address
                mov ah,9                ; print string dos request
                int 21h                 ; print copyright notice


                ; this section initializes certain flags when the program is
                ; first called up

                xor ax,ax               ; clear register
                mov busy,al             ; initialize flag
                mov scr_num,ax          ; initialize counter



                ; this section redirects interrupt vector 5 from the rom-bios
                ; print screen routine to our memory resident program  which
                ; begins at 'int_handler'

                mov ah,25h              ; set interrupt vector request
                mov al,5                ; print screen interrupt
                mov bx,cs               ; get code segment
                mov ds,bx               ; and move it into ds
                lea dx,int_handler      ; get the address of the handler
                int 21h                 ; get dos to load vector address



                ; this section terminates our program execution and lets our
                ; code remain resident in memory. rom-bios requires one added
                ; byte offset be added to dx, but a bug in it makes a few extra
                ; bytes a prudent choice

                lea dx,bootstrap        ; now lets get the length of our routine
                add dx,5                ; add a safety margin for int 27 bug
                int 27h                 ; terminate and remain resident

handler endp
cseg ends
end start
```

Edit Text and Fonts
continued from page 106

vided. Windowing is absent and frill features, like soft hyphens, are not in the last version, but are promised for the future. Upgrades can be had for $9.95. All important transitions in the program are menu-driven.

Once a text is typed it can be printed in three different modes. Draft is the fastest, whereas slow uses double-density fonts. Regular uses enhanced or correspondence-quality characters for somewhat better appearance at reasonable speed.

When in edit mode, you can activate the Help feature by hitting [Alt-H]. Also, [Fn] [Alt-H] shows a keyboard chart of font n. The SYMBOL font contains line elements to construct tables.

Many aspects of the Chiwriter system can be customized, e.g. headers and footers, default document directory, startup parameter values (insert mode, tab stops, fonts, etc...), key sequences. Use the save Parameter option to save the current settings of all parameters. If you want to make the change permanent, save them as DEFAULT.PAR and they will be reloaded next time Chiwriter is started. Alternatively, you may want to have parameter files for special jobs, e.g. one for typing letters with your address as header for page 1 and only fonts #1...#4 loaded. (To remove a font, select Change Fonts from the main menu, select the font number and hit [Return] when prompted for the new name.)

Save the parameter settings as LETTER.PAR, and when typing a letter, start Chiwriter with:

CW <filename> -LETTER

Chiwriter can edit plain ASCII files (like batch files, Chiwriter parameter files etc...). Load and save them as ASCII files from the main menu. You can design your own headers and footers, e.g. different ones for even/odd pages, but suppressed for page 1.

The Font Designer

On the regular program disk is the font editor program (called FD.exe for "font designer"). This is conceptually brilliant and simple. It works exactly as though the user were creating a macro. When you enter the program all the normal keyboard characters are arrayed on the screen. By simply hitting the appropriate key, you assign to it the character to be edited or created. A window opens displaying a grid with all the pixels of character shown, magnified about 30 times normal size.

Using the cursor keys, the user can move to any of them and fill it with solid shading by hitting the space bar. Shaded pixels can be erased by hitting delete. Once the character has been designed, it can be saved in a special font file under its own name. This file can be assigned to a function key and listed in a DEFAULT.PAR file. At bootup, the default parameters automatically load to working memory.

Now it is an easy matter to evoke the font while word processing. Hitting the appropriate function key twice loads the font to the keyboard. Now when a key is touched,

continued on page 118

Figure 5

Italic
Bold
Gothic
Script
SMALL small
Greek (α β γ Γ Δ)
Symbol (symbols © ¶ ® and line elements ┼ ┘ ┤ for tables)
Math I (≈ ± ∞ ≤ ≠ ∈)
Math II (A B ... Z and big symbols ∫ { ∑)

Daytapro Electronics

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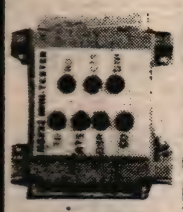
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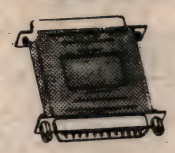


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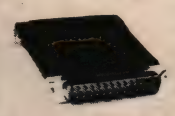


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NULL MODEM



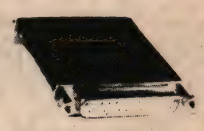
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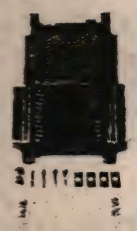
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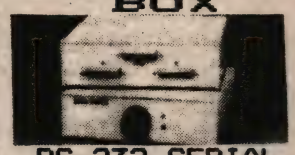


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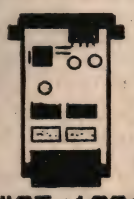
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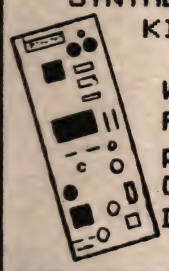
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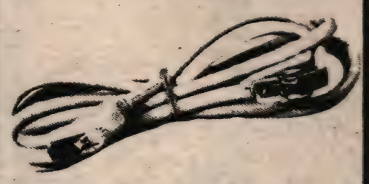
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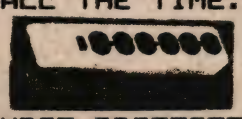
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IBM AT, XTs With Increased Storage Capacity

IBM boosted by more than 30 percent the processor speed of its powerful Personal Computer AT and doubled the storage capacity of its popular Personal Computer XT.

IBM also announced new models of its 3270 PC line that feature similar increases in function and performance.

The systems are available with a new, 101-keyboard, the IBM Enhanced Pesonal Computer Keyboard. This advanced keyboard is designed for increased productivity; the typing area, calculator-style keypad, and cursor and screen control are separate for ease of use. The function keys are located across the top of the keyboard for quick, simplified handling of a broad range of applications, including communication with larger computers.

IBM Personal Computer AT

The new AT model announced features an 8 megahertz microprocessor, one-third faster than previous AT microprocessors. The new AT also comes with a 1.2 megabyte diskette drive, a 30MB fixed disk drive, a serial/parallel adapter card, and 512 kilobytes of user memory, expandable to 10.5MB with new memory expansion options.

Those options include:

- 512KB/2MB Memory Expansion Option
- 128/640KB Memory Expansion Option
- 512KB Memory Module Kit

The new AT also is compatible with the IBM Personal Computer 3½-inch External Diskette Drive. The IBM unit price* for the new AT model is $5,295.

A new model of IBM Personal Computer AT/370, offering similar features and functions, also has been announced at an IBM unit price of $8,985.

IBM Personal Computer XT

The three new IBM Personal Computer XT models an nounced come with 256KB or 512KB of user memory and one or two half-high, 5¼ inch 360KB diskette drives. The new XTs also are available with 20MB of fixed disk drive storage--twice the storage available on earlier XTs.

*Dealer prices may vary.

Through the use of new memory options, up to 640KB of user memory may be installed onto the system planar board in the new XTs, a feature that preserves valuable expansion slots for other uses.

The IBM unit price for the Personal Computer XT with 256KB of user memory and single, half-high 360KB diskette drive is $2,145, and $2,295 for the double, half-high diskette version. The XT with 512KB of user memory and a single, half-high 360KB diskette drive and a 20MB fixed disk drive is $2,895.

In addition, a new, half-high, 3½-inch, 720KB internal diskette drive may be installed in the new Personal Computer XTs as an optional second diskette drive. As with the new AT model, users also may choose the IBM Personal Computer 3½-inch External Diskette Drive.

Other new options announced for the XT include:

- 20MB Fixed Disk Drive
- 20MB Fixed Disk Drive Adapter
- 5¼-inch, half-high, 360KB Diskette Drive
- 256KB Memory Module Kit
- 128KB Memory Module Kit

IBM 3270 Personal Computer

IBM also increased the storage and capability of its family of IBM 3270 Personal Computers with the introduction of new versions of the IBM 3270 PC and IBM 3270 PC AT.

The new versions of the IBM 3270 PC include single or double half-high, 5¼-inch, 360KB diskette drives, 640KB of user memory plugged onto the system board, 20MB of fixed disk drive storage and a choice of keyboards.

New IBM 3270 PC options announced today include:

- 20MB Fixed Disk Drive
- 20MB Fixed Disk Drive Adapter
- 320/360KB Half-high Diskette Drive

The new IBM 3270 Personal

continued on page 120

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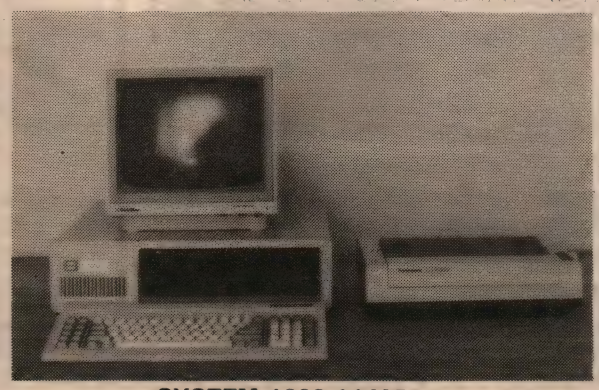
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6. monochrome monitor (TTL or composite),
7. keyboard and metal case.

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2. 135 watt power supply (ready for hard disk),
3. floppy disk controller,
4. two floppy disk drives,
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7. keyboard and metal case,
8. parallel printer card and serial card.

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e. Monochrome graphic printer card (MGP-880) .... $ 90
720X348 resolution, Hercules compatible, printer port

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i. Printer parallel card (PTC-880) ..... $ 23

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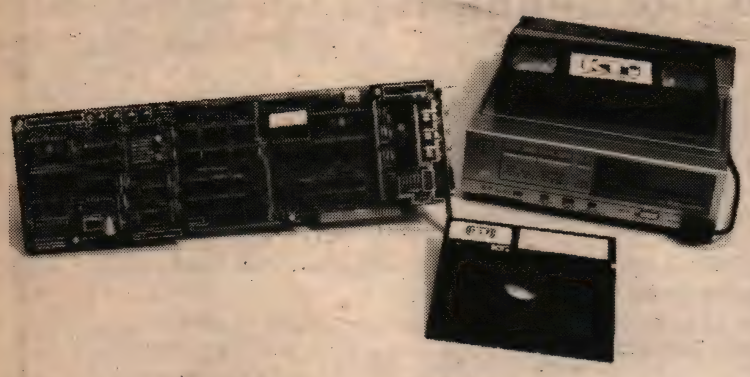
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Circuit Board Allows Backing Up Over 150 MB TO Videotape



Video Background Backup Board

Kirsch Technologies Inc. has introduced software, Back-Ground Back Up, (BBU) that allows uninterrupted, continual use of IBMs PC, XT, and AT computers, while recording memory with video recording machines. KTI's Video Memory Manager board provides VCR interface for an efficient, inexpensive way of working with computer memory.

Through the use of a unique error detection and recovery scheme, more than 150 megabytes of information can be reliably stored on one video cassette, (Both VHS and BETA format), Media costing only $.03/MB.

BBU software has easy to use DOS-like commands. All commands use the standard DOS file name format and accept global file name characters. All commands can be executed from batch files, allowing unattended operation. Backup commands are spooled in a buffer so that multiple commands can be issued at one time. An activity log is generated when backing up, providing a record of files saved. Backup and restore functions can perform in file by file or disk image mode. A tape test utility provides information relative to it's quality. A menu driven set-up utility permits user control over all important operating parameters.

Background Backup: Back-up commands run in a background mode, allowing **full** use of the computer while recording memory, video headers and title lines.

Video Memory Manager generates and places viewable file headers and title lines next to data files on tape. Headers and title lines provide information pertaining to the data files on tape.

VMM Auto Tape Positioning: (ATP) model gives complete control of VCR through key board, while the back-up and restore commands automatically start and stop the VCR. With **ATP** models, the software includes each file's tape position in a backup log. Documentation is provided for user programs to computer control the VCR; positioning for access of data files and audio/picture information.

Examples of commercial and industrial capabilities are: Data base computer positioning to mass storage of data and picture files; Computer controlled information and interactive systems combined on one media. Inventory control with pictures and data. Histogram recording of information from sensors linked to the computer. Data transmission via coaxial cable satellite of large amounts of data mixed with picture and sound information.

For additional information contact Kirsch Technologies, 201 North Riverside Ave., St. Clair, MI 48079; (313) 329-7166.

Mention that you read about it in *Computer Shopper*. ●

One-Million-Bit Chips
continued from page 100

text. A 250-page paperback novel can be stored on just six of these chips. IBM's previous highest-capacity memory chip contains 288K (294,912) bits of information.

Increasing the number of bits that can be stored on a memory chip provides a base for future enhancements for functions and performance of the 3090 system.

IBM manufactures its one-million-bit chip at semiconductor facilities in Essex Junction, VT, and Sindelfingen, Germany. The 3090 series is manufactured at three IBM locations worlwide: Poughkeepsie, NY; Montpellier, France; and Yasu, Japan.

For additional information contact International Business Machines Corporation, General Technology Division, Essex Junciton, Vermont 05452.

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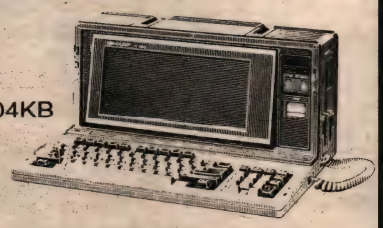
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Borland Offers "Almost Free" Update Of Reflex

Borland International, Inc. has updated Reflex, The Analyst with many enhancements including support for expanded memory beyond the 640K limit using either the Lotus/Intel or the AST Research Expanded Memory Specifications. Additionally, Reflex version 1.1 supports up to 32,500 records in memory and 250 fields, compared to the 16,000 records and 128 fields supported with version 1.0. Borland's "almost-free" update is being made available through the company for $10, to cover shipping and handling.

Now, users can build Reflex databases up to eight megabytes," according to Borland President Philippe Kahn. "Reflex 1.1, with its EGA support, can now display 40 lines of information in its spreadsheet style List View, and no other spreadsheet product has this display capability," says Kahn. Support of the new above-board memory is completely transparent to users of Reflex 1.1 because Reflex uses conventional memory until it's almost full, and then automatically stores new records in expanded memory.

Reflex 1.1 works with Intel's AboveBoard/AT and AboveBoard/PC, AST Research's Rampage! and Rampage!AT, Quadram's Liberty-PC and Liberty-AT and Tecmar's 640 Plus board, as well as many others. The update also supports additional graphics boards including the IBM EGA, IBM 3270/PC and AT&T 6300 boards. The screen driver files for each of these boards are included on version 1.1 distribution disks.

Reflex version 1.1 will load and read database files created with Reflex 1.0. The ability to turn Crosstab recalculations on and off has also been added to reduce the time it takes to develop cross tabulations.

In a one-time-only, special offer, Borland is providing the "almost-free" update to all current owners of Reflex version 1.0. Customers simply mail in $10 (California and Massachusetts residents please add appropriate sales tax) with their old diskettes. In return, they'll receive the new version 1.1 diskettes and an addendum to their Reflex manual. Reflex, The Analyst will maintain it's suggested retail price of $99.95. It's designed for an IBM PC, XT, AT or true compatible, and it requires a minimum of 384K of RAM; a graphic board, such as the IBM CGA or EGA, Hercules monochrome or other; two double-sided, double-density floppy disk drives or one floppy drive and one hard disk drive; and PC DOS 2.0 or later.

Dealer inquiries or direct orders, call 800/225-8008; or in California, 800/742-1133. For more information contact Borland International, 4585 Scotts Valley Drive, Scotts Valley, Calif., 95066. Telephone 408/438-8400.

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Zenith Data Systems To Provide U.S. Armed Forces With Software

Ashton-Tate has announced a licensing agreement with Zenith Data Systems (ZDS) under which ZDS is expected to supply the United States Armed Forces with approximately 90,000 units of Ashton-Tate's dBASE III, MultiMate 3.3 Series and dBASE II products worth more than $15 million over a three-year term.

Zenith Data Systems, serving as an original equipment manufacturer (OEM) for Ashton-Tate, is expected to supply (based on government estimates) approximately 38,500 units of dBASE III, 46,500 units of MultiMate 3.3 and 6,000 units of dBASE II. Zenith will include the Ashton-Tate products as part of its new contract to supply the government with about 90,000 units of its Z-200 series of IBM PC AT-compatible microcomputers.

Zenith will reproduce all dBASE III, MultiMate 3.3 and dBASE II diskettes and documentation and distribute the products directly to the Armed Forces. Both Ashton-Tate and Zenith will provide customer support.

"An important component of Ashton-Tate's strategic sales strategy is to increase the penetration of its products in the government sector," said David Patrick, director of strategic sales at Ashton-Tate. "Forging tight relationships with hardware manufacturers such as Zenith who have a successful track record selling to the federal government is a primary means of implemen-

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New SPSS/PC + Package Features Microsoft Chart

Microsoft Corporation and SPSS Inc. announced recently that SPSS/PC+, SPSS's statistical analysis and reporting package for microcomputers, will feature a special integrated version of Microsoft Chart. The product, called SPSS/PC + Graphics featuring Microsoft Chart, will be sold directly by SPSS. Microsoft will join with SPSS in a variety of co-marketing activities to support the introduction of the product.

"We are pleased that SPSS--a longtime leader in the statistical analysis field--chose Microsoft Chart as the business graphics package to integrate with their enhanced PC-based product," said Jeff Raiks, Microsoft's Director of Applications Marketing. "Our relationship is a valuable one for both companies--one that extends our customer base by teaming two leading products in the data analysis and graphics markets."

SPSS/PC + features a full screen editor, extensive data management facilities, and a complete range of data analysis and display procedures.

The addition of a graphics procedure in SPSS/PC + and the interface to Microsoft Chart gives users a complete array of formats for displaying the results of SPSS's powerful data analysis procedures. The graphics procedure augments SPSS's current presentation formats which include reports for summarizing analyses; presentation-ready tabular displays, including cross tabulations (e.g. sales by month by salesperson); and user-defined listings of information.

New Graphics Procedure Is Added

To incorporate Microsoft Chart into SPSS/PC +, a new graphics procedure was added to SPSS/PC +. The graphics procedure goes beyond simply facilitating the transfer of a file to Microsoft Chart--and accepts graphics commands, labeling information, and performs data summarizing functions, from within SPSS/PC +.

Once in Microsoft Chart, a user can select from a gallery of 45 pre-designed chart formats and eight major chart types. Microsoft Chart then lets the user custom design their charts with unlimited ability to move, size, reformat, add text, overlay multiple charts, add arrows, and position all elements of the chart.

SPSS/PC + Graphics features the latest release of Microsoft Chart, Verson 2.0. Designed for the IBM Personal Computer and compatibles. The new version of Microsoft Chart offers greater flexibility in both data compatibility and output device support with direct links to all popular spreadsheets including Microsoft Multiplan, and support for more than twenty additional output devices.

Microsoft Chart, Version 2.0, supports the IBM Enhanced Graphics Adapter (EGA)

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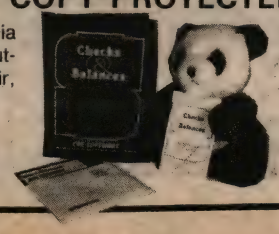
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SPSS/PC + Package continued from page 116

which provides sixteen different colors on the screen with very high (640x350) resolution. In addition, Microsoft Chart now supports a number of highly advanced output devices including high density printer, laser printers, phototypesetters, plotters, film recorders, and advanced presentation devices.

System Requirements, Availability, Pricing

SPSS/PC + Graphics featuring Microsoft Chart runs on the IBM PC/XT or PC/AT (and some compatibles) with 384K memory, a hard disk, and DOS 2.0 or higher. Microsoft Chart requires either an IBM Enhanced Graphics Adapter, IBM Color/Graphics Monitor Adapter, or Hercules Graphics Card.

In the U.S. and Canada, SPSS/PC + sells for $795. SPSS/PC + Graphics featuring Microsoft Chart sells for $395. Two other SPSS/PC + options, Advanced Statistics and Tables, sell for $295 each.

For additional information contact SPSS Inc., Marketing Department, 444 North Michigan Avenue, Chicago, IL 60611; (312) 329-3500.

Mention that you read about it in *Computer Shopper*. ●

New Release of Paradox continued from page 100

programming. For example, it can guide a novice through a simple process of selecting menu options in the application generator so that the novice can design a dedicated application for tracking and analyzing telephone sales orders. Ansa estimates that the majority of applications used in the corporate environment can be produced with the application generator.

New PAL commands enable those Paradox users who take advantage of PAL to develop programs that run even faster on Paradox 1.1. The new commands allow procedures to be stored in binary form, resulting in much faster program loading and operation.

Other enhancements to version 1.1 increase the program's functionality and ease of use. These include improved memory use for increased speed and performance, and improved procedure for importing ASCII files, automatic updating of reports and forms, access to DOS from Paradox or PAL programs and import and export of data from release 2 of Lotus 1-2-3 and release 1.1 of Symphony.

Access to DOS gives Paradox users the ability to use DOS commands without restarting Paradox. This allows developers to incorporate DOS functions into their applications and take advantage of programs written in other languages.

Price and Availability

Paradox 1.1 will sell for $695, the same suggested retail price as Paradox 1.0. Ansa Software will contact all Paradox owners who have returned their warranty cards about receiving their free update. Paradox owners who purchased Paradox 1.0 after February 15 should return their warranty card and proof of purchase to Ansa by May 1 to receive their free update. Non-registered Paradox owners can purchase the update kit for $19.95 by calling (800) 547-3000, ext. 198. Paradox 1.1 can be obtained in the United Kingdom through P&P Distributors and Softsel, and in Australia through Imagineering.

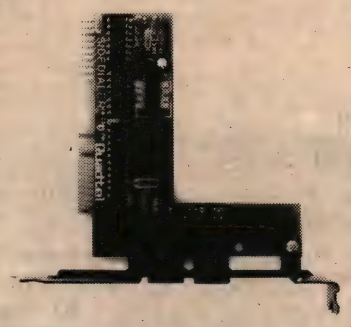
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A Multi-Lingual Word Processor For PCs

Gamma Productions, Inc. has announced Multi-Lingual Scribe, a full-featured, multi-language word processing program for scholars, students and business people working on IBM PCs or compatibles.

The program allows the user to write and edit in combinations of English, most European languages, Hebrew, Greek, Arabic and Russian. Multiple alphabets can be written in one file, even within one line, and can be both viewed on-screen and printed with full vowel points and accent marks without hardware modification to the computer or printer. Hebrew and Arabic are written from right to left, and bi-directional text is fully supported by all the word processing features such as word wrap, block moves, search/replace, and headers/footers.

An optional Font Generator allows the user to customize the supplied languages, create whole new alphabets, and customize keyboard layouts.

Multi-Lingual Scribe can import Wordstar files and ASCII files for adding foreign languages to documents created by other word processing programs. The print-out is near letter quality with full inter-character micro-justification on most popular dot matrix printers. As well, the output is compatible with Fancy Font print processor.

The $184.00 program comes complete with fonts for on-screen viewing and printing English, most European languages, Hebrew, Arabic, Greek and Russian, and with dot matrix printer support. 24-pin printer and laser printer support, additional $75.00—available August 1986. The Font Generator option, currently available — $100.00.

Requires: IBM PC, XT, AT or compatible; DOS 2.0 or higher; 320K minimum (512K recommended); IBM or Hercules color graphics card or Hercules monochrome card; 1 disk drive (hard disk recommended); Printers: Epson, IBM Graphics, Proprinter, Okidata with Plug 'n Play, C-Itoh Prowriter, or NEC 8023A.

Multi-Lingual Scribe is currently shipping and is available from the manufacturer or through retail stores. Contact Gamma Productions, 710 Wilshire Blvd., Ste. 609, Santa Monica, CA 90401; (213) 394-8622.

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POPCOM C-100 MODEM W/PFS ACCESS SOFTWARE	$255
POPCOM C-100 MODEM WITHOUT SOFTWARE	$235

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Edit Text and Fonts
continued from page 109

the new character will appear on the screen, and print on the printer. Hitting F1 returns the keyboard to normal again.

Different character sets can be assigned to upper and lower case keystrokes, and the entire revised keyboard can be viewed graphically while editing text, through the HELP utility.

Written with about 4000 lines in C, the editor reads and writes efficiently and quickly. In addition, it dumps directly to RAM so that files can be accommodated up to full available memory without speed degradation.

All Chiwriter programs work with PROKEY and similar keyboard enhancers. Even FONTRIX is compatible, but Chiwriter is much more powerful. Since .CHI files are ASCII files (with the convention that two letter sequences starting with a \ have special meanings), the Chiwriter editor can read plain ASCII files, and spelling checkers can read .CHI files. WordStar files can also be read. Before sending them, reformat them with a ragged right margin and single-spaced. Do not change them to non-document mode. Then read them in with Chiwriter (e.g. CW C:\WORDSTAR\FLATHEAD.TXT) as ASCII files. Read in files from other word processors as DOCUMENT files.

Cay Horstmann originated the program in 1984-5 because he needed a word processor that was able to manipulate math symbols and formulae, and it has been embraced enthusiastically by a number of university math departments.

continued on page 125

Smart Software System Version 3.0 Now Available



Smart System Version 3

Innovative Software, Inc., recently announced that it has begun shipments of the enhanced version 3.0 of the popular Smart Software System as well as 3.0 versions of the Smart Data Manager, Smart Spreadsheet with Graphics, and Smart Word Processor.

"The Smart Software System 2.0 was rated number one among integrated products in a recent analysis by The Software Digest Ratings Newsletter," said Mike Brown, president of Innovative Software, Inc. "And we've made version 3.0 even better."

"Smart version 3.0 now has built-in compatibility with IBM's DCA (Document Content Architecture), support for the new extended memory hardware such as Above™ Board, and access to DOS without unloading the Smart program," Brown said.

"We've also set new speed records in the Smart spreadsheet, which has consistently been rated the fastest available and in the Smart Data Manager's sort times," Brown added.

Highlights of Version 3.0 enhancements include:

* Access to DOS - Use DOS utilities or non-Smart DOS programs, or even access a second copy of Smart without unloading the Smart program.
* DCA - Use the built-in file compatibility for IBM's Document Content Architecture to exchange files and formatting commands with many other micro, mainframe and standalone word processing software programs.
* Extended Memory Options - Supports extended memory protocols for Above™ Board, Rampage™ and Thesis Fast-Card™. Boost RAM usage by up to eight megabytes with currently available hardware options.
* Enhanced Spellchecker - Choose hyphenation "ON or OFF" with Smart's new intelligent automatic hyphenation. The Smart Spellchecker is now included with the Smart Wordprocessor standalone package.
* Increased Speed - Recalculate, load and edit faster in Spreadsheet. Sort times are faster in Data Manager.
* New Word Processor features - Indent command, expanded header and footer with new formating options, plus full encryption of password protected documents.
* Total Password Protection - Multilevel password protection schemes in Word Processing, Data Manager and Spreadsheet.
* Enhanced Project Processing - Functions 20% faster.

The Smart Software System version 3.0 includes The Smart

continued on page 121

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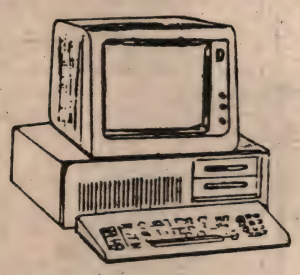
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New Low Cost Data Logger Peripheral For PCs

Rapid Systems recently released the R412 Data Logger Peripheral for IBM PC/XT/AT and compatible computers. This low cost ($688) peripheral includes all the hardware and software needed to turn the PC into a four channel data logger with selectable sample rates from .1 sec/sample to 999.9 sec/sample. The hardware features: an 8 bit A/D converter, external/internal/event driven trigger, simple BNC input connections, gain ranges from 0.8v to 160v peak in 8 steps, and diode protected inputs. Software features: menu driven, custom 160x480 pixel display, save data automatically to disk, strip chart printing with graphics printer, data acquired by time or number of samples, user selectable display headings, auto scrolling of waveform as it is acquired, help menus, and digital oscilloscope software with sample rates to 2 megasamples/sec included free. Applications include: mechanical, electrical, medical, chemical, and educational measurement of electrical signals using a personal computer. The data logger peripheral is available in stock for immediate shipment.

For more information contact Rapid Systems, Inc., 755 N. Northlake Way, Seattle, WA 98103, 206-547-8311, TLX 265017 UR.

Mention that you read about it in *Computer Shopper*. ●



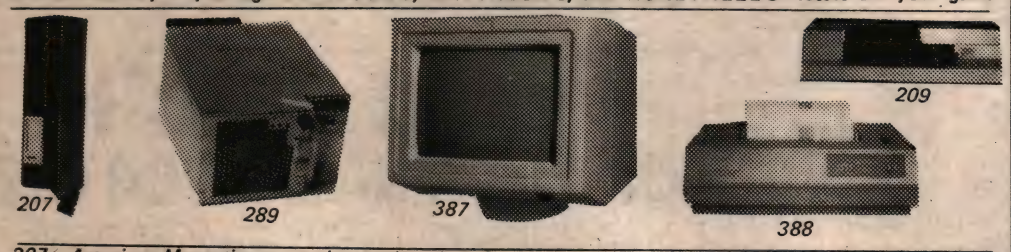
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IBM PC AT

continued from page 110

Computer ATs offer 8MHz of processing speed, 640KB of user memory plugged onto the system board, plus up to two 30MB fixed disk drives.

New options included:

- 30MB Fixed Disk Drive
- 320/360KB Diskette Drive

Expanded Memory Adapter

The new Expanded Memory Adapter, available for most models of the 3270 PC and all models of the 3270 PC AT, provides up to 2MB of user memory operating within the DOS 640KB limitation.

The adpter is a single, full-length card containing 1MB of user memory and a standard parallel printer port. The Expanded Memory Adapter will enable use of multiple, concurrent DOS applications — one up to 512KB and the others up to 384KB, while operating under Version 3.0 of the Control Program. The memory may be allocated to handle up to six DOS sessions when the Control Program System Diskette is initially configured. The optional Expanded Memory 1MB Module Kit provides a maximum 1MB of additional user memory.

Availability

The new IBM Personal Computer AT and XT models are available for ordering immediately at Authorized IBM Personal Computer dealers, IBM Product Centers, and through IBM branch sales offices. The new IBM Personal Computer AT/370 is available for ordering immediately through IBM branch sales offices and IBM Value Added dealers. The new IBM 3270 PC models are scheduled to be available later in the second quarter of this year through IBm branch sales offices, while the IBM 3270 PC AT models and memory expansion options are slated for availability in the third quarter. ●

Expense Ledger For The PC

Manhattan Software's new Expense Ledger program is ready -- a very easy-to-use program that holds 1,200 expense entries in 30 user-named categories and an unlimited number of sub-categories. A 22-page instruction manual comes with the program, but entries, on-screen review and printed reports are so straightforward and easily understandable that an average user can operate the program in just a few minutes. Category numbers and titles are on-screen at all times and there is no need to hunt through screens or notes to make a complete entry.

On-screen reviews and printed reports are comprehensive and detailed. Payments can be reviewed as entered or in categories, from any date to any date, with the entries scrolling on the screen and with a total update as each entry appears.

Payments made to any payee can be separated and reviewed on-screen or printed, as can payments for any purpose. A special Job Cost Analysis feature allows presentation and printing of costs for any job, product, project or purpose; all payments, payments by categories, category totals or monthly totals, no matter how many overall categories the payments may have been allocated to.

Ideal for personal and small-business expense and cost tracking, the program makes payment bookkeeping easy, and tax preparation as easy as it can be, with all expenses categorized and tax-deductibles identified.

Expense Ledger runs on any IBM-PC or full compatible, requires 256K memory and one double-sided 360K floppy drive. The screen format is 80 columns. Retail price is $49.95.

For further information contact Manhattan Software, P.O. Box 148, Peterborough NH 03458, (603) 924-9998.

Mention that you read about it in *Computer Shopper*. ●

Smart Software System
continued from page 119

Data Manager, Smart Spreadsheet with Graphics, Smart Word Processor, Smart Communications and Smart Time Manager. In addition, the system includes the Smart Programming Language, which permits complex applications development using procedural language commands, debugging commands and powerful structures not found in leading basic languages.

The three separately packaged modules are The Smart Data Manager (data management, communications, time manager), The Smart Word Processor (word processing, communication, time manager, spelling checker) and The Smart Spreadsheet with Graphics (spreadsheet, graphics, communications, time manager). The Smart Programming Language and formula calculation are part of all three modules.

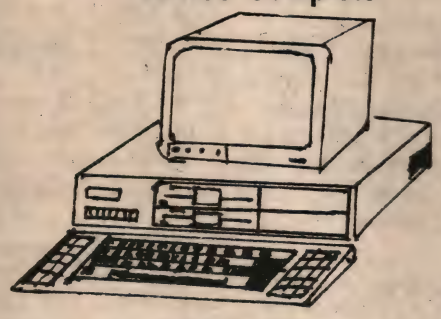
The Smart Software System Version 3.0 and standalone modules are available at significant discounts to current Smart owners under a special upgrade program. Owners of Smart version 2.0 products who purchased their software after January 1, 1986, are eligible to upgrade to a like version 3.0 product at no charge. Proof of purchase date is required. Details of the upgrade program have been mailed to all registered users.

Suggested retail prices for the version 3.0 products are $895 for the Smart Software System (includes all modules), $495 for the Data Manager, $495 for the Spreadsheet with Graphics and $395 for the Word Processor with Spellchecker.

Brown added that Innovative's newly introduced LAN Multiuser Version of the Smart Software System in-

continued on page 124

"NEW PULSE XT COMPATIBLE SYSTEM"
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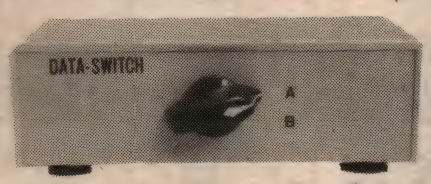
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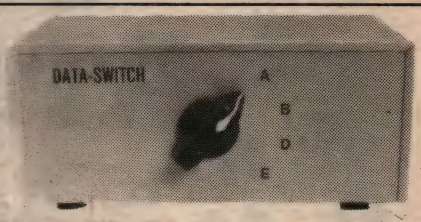
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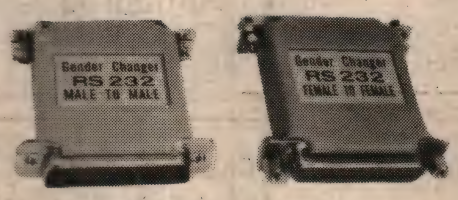
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Microsoft Word Release 3 For Corporate Users

Microsoft Corporation announced Microsoft Word Release 3, the first word processing program to respond to corporate users' by integrating an outlining capability, mathematical and sorting functions, and expanded support for laser printers.

"Since we first brought out Microsoft Word in 1983, we have continued to keep it on the leading edge of software and hardware technology in order to meet the needs of users. This version is designed for the corporate word processing environment because it integrates all features needed for people in business to organize their thoughts and produce high quality documents," says Jon Shirley, Microsoft president.



Microsoft Word 3 Process Numerical Data as well as Text

Microsoft Word 3 contains a fully integrated ouline processor.

Microsoft Word 3 supports over 70 differnt models of printers (See Word Overview for list)

Microsoft Word 3 can download multiple fonts for use on laser printers.

Microsoft Word 3 automatically generates indexes and tables of contents.

Microsoft Word 3 is not copy-protected.

Microsoft Word 3 can select, manipulate and format columns of data or numbers.

Microsoft Word 3 can perform five mathematical tasks.

Microsoft Word 3 can sort words or numbers in ascending or descending order.

Microsoft Word 3 can print paragraphs side-by-side, in parallel columns.

Microsoft Word 3 can convert files to and from the standard DCA format.

Microsoft Word 3 has computer-based training lessons, directly accessible from within the program.

Microsoft Word 3 has improved support for high-resolution graphics cards like the IBM EGA.

Microsoft Word 3 automatically numbers sections and paragraphs.

Microsoft Word 3 automatically prints dates and time entries.

These and over 50 other new features have been added to Word 3. The speed of execution has also been increased, most of the frequently used operations, like scrolling, are faster by more than 30-40 percent.

Word 3 is the first program that a writer can use all the way from initial organization through composition, formatting, error-checking, and indexing to printing of professional-quality documents.

Word 3 Speaks In Fonts To Laser Printers

Laser printers, popular in corporations, are enhancing the quality of professional documents like reports, letters, and proposals. Microsoft pioneered support of laser printers with Word 2.0, and continues to expand this capability with Release 3. Word 3 can not only assign up to 64 fonts, but can also download fonts to laser printers like Apple's LaserWriter, Hewlett-Packard's LaserJet Plus, and IBM's Pageprinter without the need for additional software. By providing access to multiple fonts and formatting features, Word 3 streamlines and speeds the process of creating professional-quality business documents.

Research indicates that high quality appearance of documents is the highest priority in business environments. A study by Boston University states that business documents are more credible and can be read 27 percent faster when produced on a laser printer.

A Word Processor And Outline Processor In One

In recent years, outline processors have won much popularity among people who must create structured documents, memos, and reports. But until now, these individuals needed a separate program such as ThinkTank to

continued on page 125

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Zenith Data Systems continued from page 116

ting this strategy," added Patrick.

The dBASE family of products has been a standard in the Armed Forces and was required specifically by the government to be included in the bid. dBASE II was part of the 1983 military contract that Zenith won, which will be replaced by the new contract.

dBASE II and dBASE III are relational database management systems for microcomputers. MultiMate 3.3 Series is an advanced word processor for microcomputers.

Ashton-Tate reported revenues of $121.6 million and net income of $16.6 million for fiscal 1986, ended January 31, 1986, an increase of 47.7 percent and 122 percent, respectively, from the previous year.

For further information contact Ashton-Tate, 20101 Hamilton Avenue, Torrance, California, 90502-1319; (213)-329-8000. ●

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User Supported Free Calc

Stilwell Software Products is pleased to announce release 2.0 of FreeCalc, one of our three user supported software products for the IBM-PC (FreeWord, is our word processor and spelling checker available for $49, FreeFile, is our database program, and is available for $45).

FreeCalc has 250 rows and 50 columns. The program has been designed to give particular attention to the needs of the first time spreadsheet user. For example, the user can create a useful spreadsheet without any knowledge of how to write a formula in FreeCalc. This is made possible by providing the user with certain basic formulas and allowing the user to "point" (by use of the cursor) to the cells to be included in the formulas. FreeCalc comes with three sample spreadsheets and a tutorial.

FreeCalc is not just for beginners. The program also has an area for the user to enter their own formulas. The formulas can be as complex as you like. They may contain any number of expressions, and parentheses may be nested as deeply as desired. FreeCalc also supports the use of Macros to save keystrokes.

You can become a registered owner of FreeCalc for a $47.50 contribution. This will entitle you to a copy of the program, a printed manual (with table of contents and an index), and a separate program called The FreeCalc Auditor. The audit program will examine your FreeCalc spreadsheet and list summary information about your spreadsheet, prints formulas, creates a cross reference, and looks for possible errors.

FreeCalc is also available for a $10 contribution. For this price, you can get the program and the documentation on a diskette. You will not get a printed manual, nor The FreeCalc Auditor, nor be eligible for support from Stilwell Software Products. You can try the program out, and send in the full contribution at a later point.

For further information contact Stilwell Software Products, 16403 N. 43rd Drive, Glendale, Arizona 85306; (602) 978-4678.

Mention that you read about it in *Computer Shopper.* ●

New Amdek Color 730 Analog RGB Monitor IBM For P.G.A. Board

Amdek Corporation (Elk Grove Village, IL) now offers a stunning analog RGB color monitor compatible with the IBM Professional Graphics Adapter. This new high-resolution monitor can display 256 colors at a time, selected from a 4,096 color palette. It's especially well-suited for use in computer-aided design, computer-aided engineering, realistic "high-touch" graphics and educational applications. The Amdek Color 730 PGA-compatible Analog RGB Monitor is available for $1,099 (all prices suggested US resale at participating distributors and dealers; dealer, OEM and VAR inquiries are invited), an optional secured tilt/swivel stand for $29.

The Amdek Color 730 boasts a non-glare etched glass CRT with up to 720x480 (HxV) resolution. Its horizontal sweep rate range is 29.5-32.2 KHz. Its high 25 MHz bandwidth and .31 mm dot pitch provide extremely sharp, steady graphics and text (up to 25 lines by up to 80 characters per line).

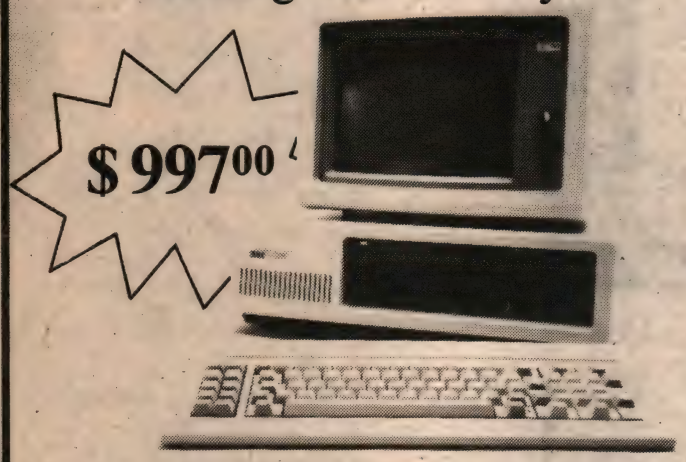
Amdek provides a two-year warranty on parts and labor; the CRT (cathode ray or "picture" tube) carries a three-year warranty.

The Color 730 measures 12.4x14.3x15.7 inches (HWD) and operates from 120 Volts AC, 60Hz. It is U.L. listed and FCC certified.

For further information contact Amdek Corporation, 2201 Lively Boulevard, Elk Grove Village, IL 60007; (312) 364-1180.

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Smart Software Systems continued from page 121

cludes all the enhancements of version 3.0 and is the first truly multiuser integrated business applications software for Local Area Networks.

"The LAN Version of Smart offers network users all the features of our top-rated integrated software package, plus true multiuser capabilities such as data sharing within and between applications, all at a significant cost savings," Brown said.

Other features of the Smart LAN product include:

* File & Record Locking - Allows Local Area Network users to take full advantage of network capabilities with true multiuser access and updating of shared files.
* LAN Compatibility - The Smart LAN Multiuser Version is designed for use with 3.1 DOS CALL compatible networks including the IBM PC Network, AT&T's STARLAN, Novell Netware, 3Com 3+ and most others.

Brown says Innovative's special upgrade program allows current Smart owners to upgrade from standalone modules or systems to the Smart LAN Multiuser Version at significant discounts.

The Smart Software System and Smart Software System LAN Multiuser Version are sold through authorized Smart dealers. Dealer locations may be obtained by calling 1-800-GET-SMART, (in Kansas dial 1-913-492-3800). Smart Software is a product of Innovative Software, 9875 Widmer Road, Lenexa, Kansas 66215.

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Microsoft Word Release continued from page 122

enjoy this power.

Release 3 adds outlining to Word's many features. This fusion makes it easy to enter ideas into the word processing package, rearrange them, and amplify them as thoughts come to mind. The outlining function can be used along with the word processor or by itself for writing tasks requiring much conceptualization and organization, such as text slides for presentations, minutes of meetings and ordered lists.

The user switches to Word 3's outline processor by simply pressing a function key, then begins typing in headings and assigning levels to them. Text at each level of the outline can be assigned a specific style, such as **bold** or CAPS, and will be automatically formatted per level. It is easy to shift headings and body text and to collapse and expand headings within an outline. In addition, long documents can be telescoped to display only major headings, and when the headings are rearranged, the entire document is reordered accordingly. A user can easily switch between the outline and document modes.

Math In A Word Processor

Written documents frequently include numerical data which the writer must calculate quickly. Word 3 adds, subtracts, multiplies, divides, and figures percentages, so Word users don't have to exit to a separate program or resort to a calculator to determine these number.

Word 3 Sets Up Tables, Indexes And Tables Of Contents

Tables are common in business reports, and Word 3 handles them dexterously. It lets users select columns of numbers or data and delete, copy or move them. It also allows the calculation of numbers in a selected column, like a spreadsheet, and the sorting of numeric or alphabetic lists, in ascending or descending order. Paragraphs of text can also be aligned side-by-side in parallel columns.

Through pre-assigned entries, Word 3 automatically creates indexes and tables of contents. It will also generate other tables, such as lists of figures or photographs.

In addition, Microsoft offers a version of Word for local area networks. This allows users to easily share and access data across PCs. As more corporations move toward networks, Word provides a convenient upgrade path.

Word 3 is for use on the IBM Personal Computer and compatibles and requires 256K. Suggested retail price is $450.00. Current registered owners who purchased Word prior to March 1, 1986 can upgrade to Release 3 for $75.00. Those who purchased Word after March 1, 1986 will receive a free copy of Release 3.

Microsoft Corporation manufactures and sells a wide range of software including operating systems, languages and applications software, as well as hardware and books for the microcomputer marketplace.

For additional information contact Microsoft Corp., 16011 NE 36th Way, Redmond, WA 98052; (206) 882-8080.

Mention that you read about it in *Computer Shopper*. ●

Edit Text and Fonts continued from page 118

He failed to find a commercial publisher so determined to market the product himself, using the PIRATEWARE scheme.

So far it has had little exposure to the general user. It is this reviewer's opinion that the latter will find Chiwriter a real addition to an everyday software library. It produces a much better "near" letter quality typeface on my Epson FX-80 than anything else tried. For that reason alone, I am now doing with it all of my correspondence. I expect others will feel as I do, and that, with some exposure in the *Computer Shopper*, Horstmann will soon have a international, multi-lingual winner. ●

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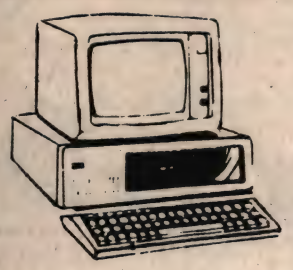
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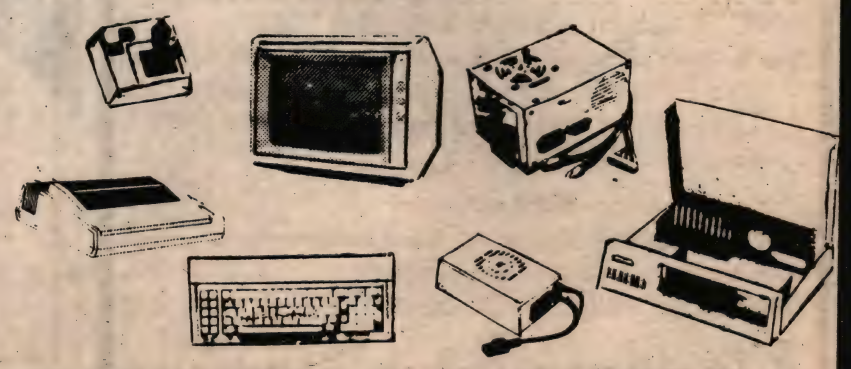
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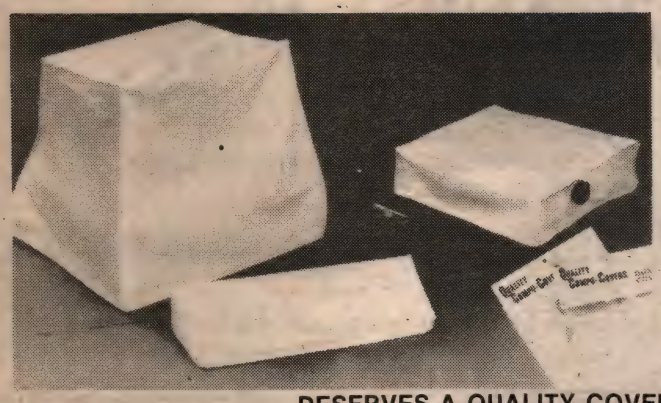
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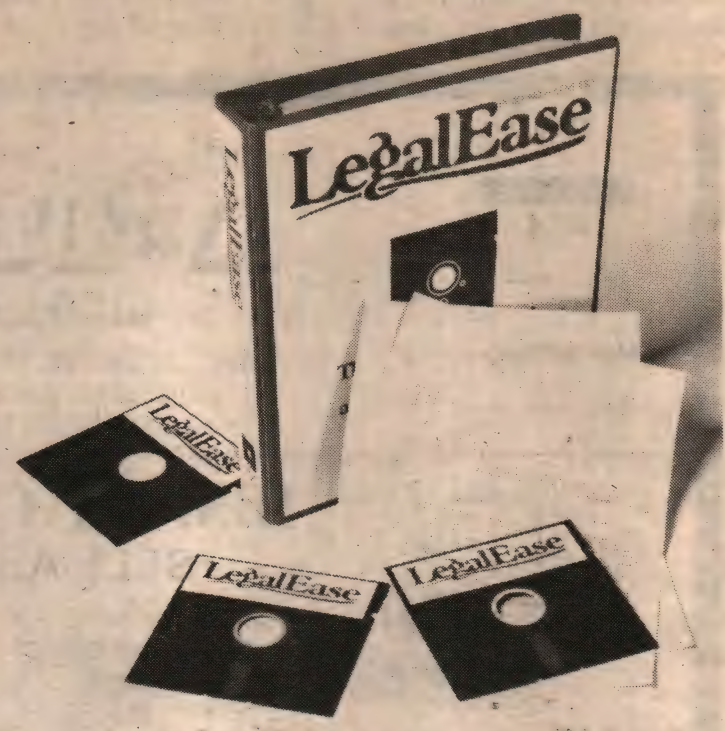
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Now On Floppy Disk With LegalEase



Boston-based lawyer and co-founder of HDG Software, Richard H. Gens, announced the introduction of LegalEase, a personal computer, business agreement and contract software program for individuals and small to medium sized businesses. LegalEase allows users to create their own business forms and personal contracts just by editing basic document formats contained on the disk.

LegalEase consists of over 150 legal and business forms including promissory notes, credit/collectors forms, buy/sell agreements, employment forms and agreements, corporate records forms, liability forms, simple wills and more. With LegalEase, the user can call up any one of these forms from an on screen menu, edit it to whatever the specific needs may be, and then print it out using any standard word processing software.

"The main reason for developing LegalEase and forming HDG Software was because, as a lawyer, I felt that it should be possible for individuals to protect themselves legally yet cost effectively by creating their own legally-binding contracts and agreements," said Gens, a former assistant attorney general for Massachusetts. "Now with LegalEase, this is all possible."

LegalEase also saves the user additional legal fees by making available the capability to prepare for legal counsel.

The concept of putting the forms on a floppy disk and using a menu driven interface in LegalEase was suggested by Helen Gens, co-founder of HDG Software. LegalEase has three independent components contained on one floppy diskette: PC Write word processing, a menu generator from MAGEE Enterprises, and forms, which can be used together or separately. The open architecture of LegalEase allows the user to add his or her own forms, expand the menu, and adapt the entire program to any standard word processing software including PC Write, Wordstar, or MultiMate.

LegalEase runs on the IBM PC, XT, AT and compatible personal computers and is marketed by HDG Software Inc. It requires a minimum 128 K memory for dual floppy computer.

HDG Software Inc. is now offering a free copy of PC Write, a best selling word processing program, with their LegalEase package for only $89.95 plus a $5.00 shipping cost. This software is available directly fom HDG Software Inc., 54 Whitney Street, Sherborn, Massachusetts 01770-9990, or by calling (617) 651-1881.

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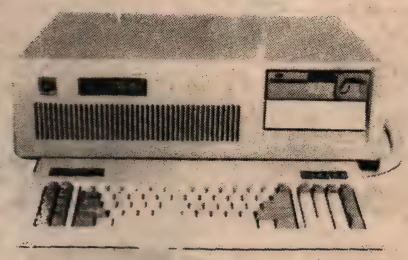
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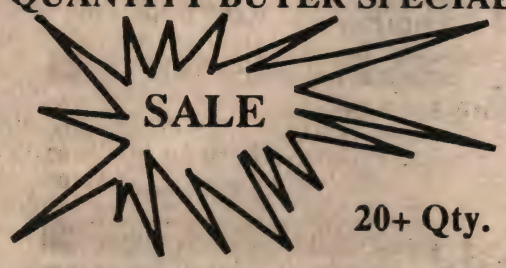
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Expanded Memory/Multifunction Board

Offering all the functions of AST's industry-standard SixPakPlus enhancement board, SixPakPremium adds a new dimension to traditional multifunction products. It operates under AST's En-Enhanced Expanded Memory Specification (EEMS), which can increase the PC's addressable memory by a full 2 megabytes. That expanded memory is combined with DESQview multitasking/windowing software, delivering unprecedented multiple-application handling capability to the PC. With SixPakPremium, PC users can run up to nine PC DOS applications programs concurrently, turning the PC into a true office productivity tool.

SixPakPremium's DESQview handles more than 200 of the most popular PC applications programs right off the shelf. Because no special versions are required, users can run the Lotus 1-2-3, dBASE II/III or WordStar packages they already own. And SixPakPremium prevents obsolescence: It provides plenty of memory capacity for expanding software libraries.

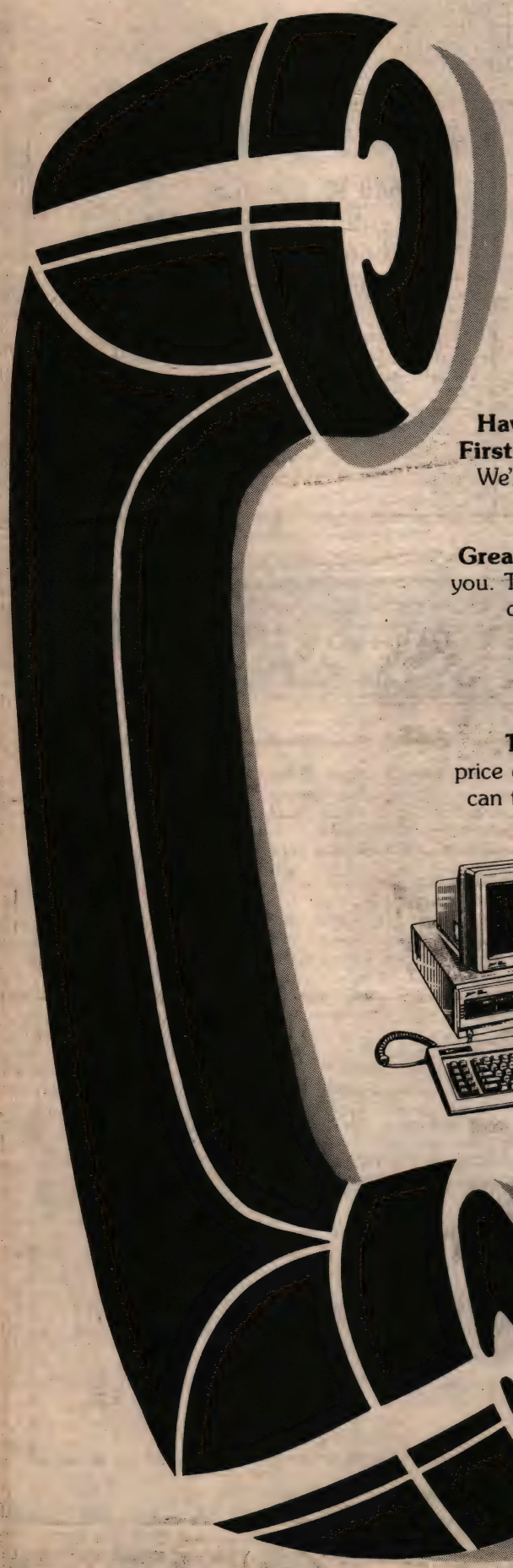
SixPakPremium also comes with AST's SuperPak utility software, which means users can easily create RAM disks and allow for print spooling.

The SixPakPremium expanded memory/multifunction board features two serial ports (one standard, one optional), one parallel port, a battery-backed clock/calendar and an optional game adapter port for connection to PC-compatible peripheral devices. It is priced from $595 to $1,445 depending on configuration. AST began shipping the SixPakPremium in mid-April to its authorized dealers, value-added resellers (VARs) and distributors.

For additional information contact AST Research, 2121 Alton Ave., Irvine, Calif. 92714; (714) 863-1333.

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Syon, A Graphics Software Products

Stella Systems Corporation, the Cupertino-based designer, manufacturer and marketer of business graphics software for personal computers, recently introduced Syon, a graphics software product for business users of the IBM PC family and compatibles.

Syon offers users a choice of 11 graph types, provides integration of text and graphs, and has pictograph symbols which can be created for business reports. Using the pictograph feature, users can create and store up to 26 symbols to customize graphs for reports or business. Syon also loads and edits files from any IBM compatible word processing software package and integrated packages, such as Lotus 1-2-3 or MultiPlan. In addition, Syon allows customizing features such as variable line types and thickness, an eight color display and the ability to explode sections of pie charts.

Syon's resolution is 640 x 200 monochrome pixels and 320 x 200 color pixels. The software has a suggested retail price of $199, requiring 256K of memory and runs on IBM PC, XT, AT and compatibles.

For additional information contact Stella Systems, 10430 S. De Anza Blvd., Suite 185, Cupertino, CA 95014; (408) 257-6644.

Mention that you read about it in *Computer Shopper*. ●

WordTech Systems Introduces Low-Priced C Compiler

WordTech Systems, Inc., a software developer best known for its database management tools, has introduced HOT C, a new C Language compiler. The basic package contains the compiler, a C Language tutorial, a program editor and a symbolic debugger. Features include a preprocessor, code generator, optimizer, macro-assembler, large and small memory models, and a UNIX-compatible function library.

HOT C is available for MS-DOS, PC-DOS, CPM 80 and CPM 86 operating systems. The retail price is only $99 and HOT C is not copy protected.

"HOT C produces some of the fastest and most compact code on the market today," said David Miller, WordTech's president. "The package includes all the necessary tools to guide the user from his first introduction to the C Language through the most sophisticated and demanding applications programming. We feel HOT C will become the Turbo Pascal of C compilers."

The C Language was

continued on page 131

Palantir Software Announces New Word Processor

Palantir Software recently announced a new version of the Word Processor, including the Palantir Speller and MailOut as added features. The updated Word Processor, version 3.0, is state of the art, with features derived from extensive studies of word processing productivity. Shipping began March 3, 1986. The suggested list price is $395.

New features include column manipulation, horizontal and vertical line drawing for organizational charts and other graphic applications, enhanced menus include program and document paths for easier hard disk control, non-english language character support, built-in DOS commands, extensive pop-up menus, and picture oriented help screens. In addition to these features, the updated Palantir Speller is included in the Word Processor. "Palantir Software, as always, continues to offer more features per dollar than any other word processor," stated Charles Mitchell, Director of Development.

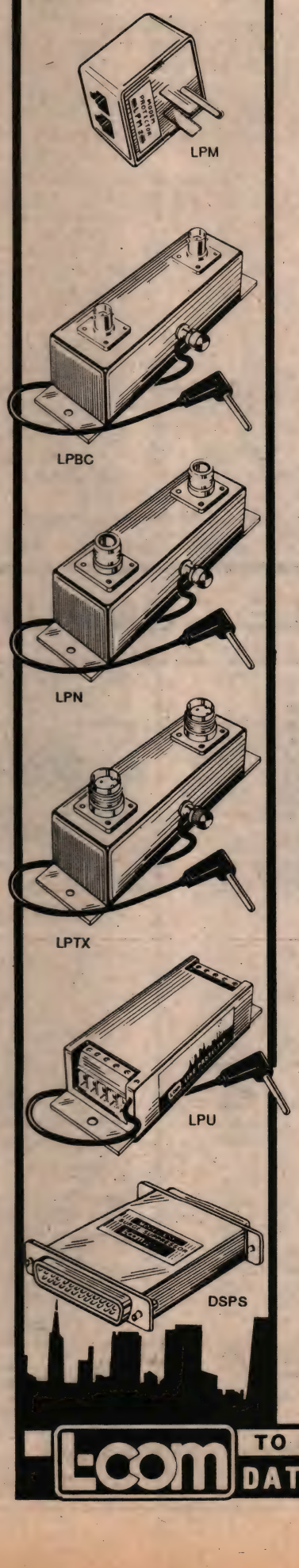
Palantir Software's main improvement goals have been threefold: to increase power, to retain simplicity by limiting command sequences to one or two logical keystrokes, and to reduce the initial training time. The manual was rewritten as the final stage in accomplishing these goals. It was written using the Palantir Word Processor and a laser printer with an abundance of screen pictures augmenting the simplified text. "By using pictures and rewriting text, we were able to reduce the size of our manual by one-third. Yet we have sacrificed nothing. The menus on the screen actually speak for themselves," Mr. Mitchell added.

Current registered users of the Palantir Word Processor will be notified of the update.

For further information contact Palantir Software, 12777 Jones Road, Suite 100, Houston, Texas 77070, (713) 955-8880.

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MODEL	CONNECTOR	# LINES		CLAMP VOLT	1-9	10-24	25-99

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Modem Protectors - Plug In Series with RJ-11 Line, has Instant Built-In Ground

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BNC Station Protectors - Offer Computer & Peripheral Data Line Protection
There is a better way to ensure dependable surge protection for your voltage sensitive coaxial cables. L-COM's Two-Stage Line and Station Protectors are "invisible" to normal data signals but quickly depress harmful voltage transients generated by atmospheric and man-made sources. An added feature offered on all protection devices listed below is a "simple" means of grounding. Each unit is supplied with a special 18" cable that plugs into any convenient grounded AC outlet. Line Protectors should be installed at each end of a long or outside line for maximum protection.

LPBC	BNC	1		6.8V	59.00	53.10	47.20

"N" Station Protectors - With Built-In and Improved Dual-Stage Protection

LPN	"N"	1		6.8V	66.50	59.85	53.20

Twinaxial Line Protectors - Install at each Point of Entry for Maximum Protection

LPTX	Twinaxial	2		5.1V	88.00	79.20	70.40

Universal Line Protectors - Safeguard Equipment against Dangerous Transients
The LPU-2 Series has a Two-Stage circuit for maximum protection of your equipment. The first stage has a gas tube device to handle heavy discharges and a Bipolar Trans Zorb for voltage limiting. A cast metal enclosure is provided with handy "no fault" Terminal Strips. Two clamping voltages are offered: RS232 > 26V and RS422 > 6.8V. Response time is less than 10 nano seconds; reliable to 10K Baud; Series Res. 5 ohms. A short ground cable with molded plug is supplied, which inserts into any AC grounded outlet.

LPU22A	Term Strip	2 (1 pr.)	RS442	6.8V	59.00	53.10	47.20
LPU24A	Term Strip	4 (2 pr.)	RS442	6.8V	88.00	79.20	70.40
LPU22B	Term Strip	2 (1 pr.)	RS232	25V	59.00	53.10	47.20
LPU24B	Term Strip	4 (2 pr.)	RS232	25V	88.00	79.20	70.40

The LPU-3 Series housed in an identical cast metal enclosure, contains a Two-Stage Protection circuit which includes Metal Oxide Varistors for faster response to handle an avalanche of high currents and a Bipolar Trans Zorb for voltage limiting. Recommended for modem protection or other fast operational devices. Introduces an unobjectionable 5 ohms. Supplied with a short ground cable with molded plug which inserts into any AC grounded outlet.

LPU32A	Term Strip	2 (1 pr.)	RS422	6.8V	69.00	62.10	55.20
LPU34A	Term Strip	4 (2 pr.)	RS442	6.8V	98.00	88.20	78.40
LPU32B	Term Strip	2 (1 pr.)	RS232	25V	69.00	62.10	55.20
LPU34B	Term Strip	4 (2 pr.)	RS232	25V	98.00	88.20	78.40

LIMITED WARRANTY: L-COM Warrants all protection products for a period of one year against defects in material and workmanship, if they have not been tampered with. Furthermore, L-COM shall not be responsible for any consequential damage or liability whatsoever, including without limitation, damages for injury to any person or property.

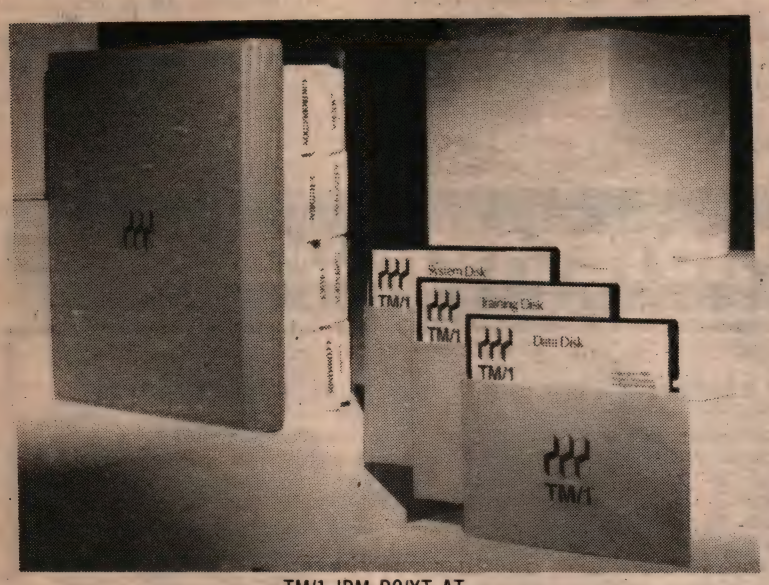
RS-232 Surge Protectors - Guard Against Voltage Spikes Entering Your EIA Ports
Metal Oxide Varistors on crucial lines (see below) act to clamp surges above 26 volts without affecting normal operation. This compact adaptor mounts permanently in series and all 25 lines are wired through. To be most effective Surge Protectors should be installed on both ends of a long line. Electrical surges clamp to frame ground and no external ground is necessary. Equipped with a male and female connector for in-series operation.

DSPS-3	RS232 Protector, lines 2, 3 & 7	24.95	22.70	19.96
DSPS-4	RS232 Protector, lines 2, 3, 7 & 20	26.95	24.52	21.56
DSPS-5	RS232 Protector, lines 2, 3, 4, 5 & 7	28.95	26.34	23.16
DSPS-5B	RS232 Protector, lines 2, 3, 4, 7, & 20	28.95	26.34	23.16
DSPS-6	RS232 Protector, lines 2, 3, 4, 5, 7, & 20	30.95	28.16	24.76

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TM/1 Users Hail Second Release



TM/1 IBM PC/XT AT

Release 2.0 of TM/1, the business analysis software for the IBM PC, PC AT, PC compatibles, and the WANG PC, features network support, expanded documentation, enhanced ease of use and more powerful analytical capabilities, according to customers who received preview copies.

Publisher Sinper Corporation, North Bergen, New Jersey, is now shipping Release 2.0 of the "tables manager" for $795. A training version, which includes the complete documentation, retails for $39.95.

"TM/1 is part of our basic tool kit in Exxon's crude oil supply department," said David Bailin, operations support manager for Exxon International Company, which is responsible for balancing Exxon's supply and demand of crude oil worldwide.

"It provides several features, especially multidimensionality, which no other product on the market has to offer. I can use 20 different spreadsheets and store the data in a single data base. And its Local Area Network capability addresses multiple volumes of data and lets several different analysts share it simultaneously. It allows data to be taken out of the spreadsheet and handled in English, something I can't do with Lotus," Bailin said.

Steven Brod, a New York-based CPA who has been using TM/1 since its first release in June 1984, said, "What's hard to do with spreadsheets and relational database managers is conversion of transactional data into tabular format and its subsequent analysis and manipulation. Sophisticated analytical capabilities and a tabular database architecture are among TM/1's primary benefits.

"Data that already has been computerized using traditional spreadsheet and relational database programs can be easily imported into TM/1 for analysis."

TM/1 -- which stands for Tables Manager -- is intended primarily for high-end users doing financial analysis and budgeting, market research and sales analysis, industry analysis, business and corporate planning and other areas where data is tabular in nature. It is sold directly by Sinper, regional marketing representatives and through value-added-resellers.

Since its introduction, TM/1 has been embraced by Fortune 500 oil companies and insurance underwriters, banks, universities, and accounting firms, as well as end users in need of microcomputer software capable of sophisticated analysis. Prior to the introduction of TM/1, this level of analytical power was only available on mainframe systems.

William Buckley, CEO of Crum and Forster's billion dollar subsidiary, U.S. Insurance Group, claims responsibility for introducing TM/1 throughout his company.

"I was looking for a relational database manager but instead I started experimenting with TM/1. I'm a CEO, not a programmer, but I found it very simple to use. It allows me to organize numbers in any manner that I want. Even my wife uses it for keeping our household accounts." Buckley said that TM/1 has become U.S. Insurance Group's standard for establishing databases and controlling finances.

TM/1 also includes an application development language. Edward C. Lasher, vice president/financial consulting and development for Miami's Southeast Bank, N.A. says, "We're going way beyond the multi-dimensional situation that TM/1 is most popularly used for. With TM/1 it takes about one-tenth the time that it would take to develop an application with other languages."

"We have put almost all our budgeting and forecasting models on TM/1. I haven't seen anything else on the market that comes close to filling our needs. And product support has been nothing short of phenomenal," said Mike Ryall, controller for Lytel Corporation, New Jersey, an opto-electronics manufacturer.

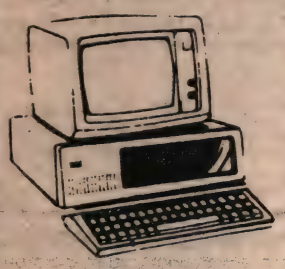
Additional information on the product and other services offered by the company can be obtained directly at: Sinper Corporation, 8901 Tonnelle Avenue, North Bergen, New Jersey, 07047, (201) 662-7999.

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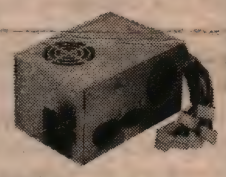
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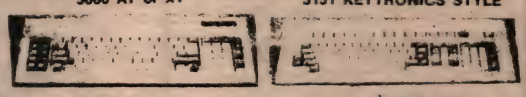
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Color graphics w/printer port	$95
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WordTech Systems continued from page 129

developed by AT&T/Bell Laboratories in the early 1970s. Extremely powerful and flexible and suitable for both systems and applications software, C is becoming an increasingly popular programming language. "Our dBaseIII Compiler customers have been asking for the ability to link compiled C programs into their compiled dBASE applications," explained Miller. "More and more business developers of all kinds find themselves requiring the power of C. HOT C provides the ideal environment for meeting these needs."

As a limited time promotion, WordTech will bundle HOT C with its line of dBASE Compilers as well as offering it as an independent product. It will be distributed through Softsel, Software Resources, and Softeam/Ingram Software as well as through WordTech's international and domestic distribution network.

For more information contact WordTech Systems, Inc. P.O. Box 1747 Orinda, CA 94563; (415) 254-0900.

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Inside Commodore continued from page 65

then around April, then.....(you set the date). In the meantime, COMPUTE! and ABACUS have each been producing several volumes of good documentation for the C-128.

The latest Commodore rumors are 1) the 68020 based 32-bit Amiga (code named "Ranger") will finally appear late this year, after over a year and a half in development, 2) the C-128 will be available in an advanced version that has 640K internal RAM, and 3) the C-64 will be repackaged into a C-128 case with the new keyboard and numeric pad. (Delivery dates on some of these items is expected sometime between Halloween and April Fool's Day...in other words, don't hold your brath!)

No Rumor—The RAM Packs Are Here!

Although I personally haven't laid eyes on them (yet), I have heard from reliable sources that the 1700 and 1750 RAM expansion cartridges are definitely shipping to dealers. Prices are fairly high (as expected). The 1700 is running about $175-200, and the 512K 1750 is about $275-300. Yeoww! But, the speed is also there...about 200 times faster than your trusty old 1541!

One developer who has been working with the 1750 for quite a while has confirmed the fact that the RAM packs definitely *do* work with the C-64. Commodore has been totally "mum" on the point, but it's a fact (unless they do something deliberate at the last minute to make them incompatible!).

When these things finally do show up in quantity and the price drops some, they will open new worlds of software possibilities. I remember when the 64K of the C-64 seemed like "mountains" of RAM, compared to the sparse VIC-20. It probably won't be long before a "vanilla" 128 or 64K machine is considered "bare bones" by us all.

"PPD" (Parallel Device Driver Program) Ver. 3.0 Lives!

Version 3.0 of the C-64 User Port to Parallel Printer Driver program (known hereafter as "PPD"), is finally done. It contains several new features and improvements, some of which were previewed in the April column. I've included a BASIC "type-in" version of the program and complete instructions in this issue of the *Computer Shopper*.

PPD Goes "Shareware"

I have decided to make all future versions of PPD available as "Shareware" products. In case you are unfamiliar with the concept, 'Shareware' is fully described in the instructions that accompany the PPD program listing. Like Public Domain software, Shareware allows user the chance to try out programs for "free" (you can type in the program from the listing here or get a copy for personal use from others who have ordered it). Unlike PD software, it protects a program author's right to commercially exploit software as he/she sees fit (since the Shareware author keeps their Copyright intact). There are several new programs for Commodore systems that are being distributed in this manner.

The $10 copy and registration that I'm asking for PPD is an attempt to provide more user support for the program. This version took much longer to develop than previous ones (due to the advanced features.) Future versions will probably take even longer, if they are to have more features.

In return, I hope to provide a higher level of support to registered owners of PPD. The continued improvement and development of the program requires reasonable remuneration. I don't think $10 is out of line.

If you register your copy, you'll also be able to upgrade to future versions of the program for a minimal postage and handling fee. The instructions with the PPD program also outlines the new policy on PPD disks, and other information. I suggest you red it for the full story on PPD.

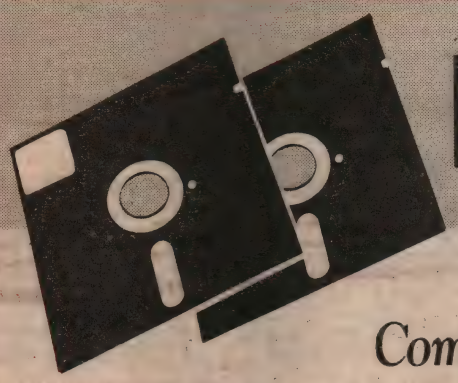
You can order you "registered" Shareware PPD disk, by sending $10 in cash, check, or money order (made payable to me) to this address: Ted Drude, P.O. Box 533, Cedar Falls, IA 50613, Attn: PPD disk offer.

In return, I will send you a postpaid, high quality, 1541 format disk with PPD on it (along with some other files described below). There have been some delays in the past, partially due to confusion over ordering procedures. By restricting this offer to the address above and postpaid orders only, the process should speed up considerably.

In case anyone is interested, I am still planning on a version of PPD that cleanly interfaces with SpeedScript 3.0, but it's not done yet. Please be patient, I'm working on it! When it's done, I will be distributing it

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First C-128
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choose the UTILITIES section and pick the file you want to download from the menu. A brief description is provided, just choose the download option. On QuantumLink, you must go to the Software Download section and browse through the list of programs there. Choose the download option for the files you need.

Don't look for the update courtesy of Commodore. At the moment Commodore appears to have no plans to offer the update on disk.

Compatibility

With the purchase of a 1571 disk drive, the 128 gains access to a lot more software. While the 128 will work with the 1541, the 1541 can only read CP/M software that is formatted in Commodore GCR disk format. This format is the same as that sold with the old $75 CP/M cartridge, so software in that format is legible, though it may not be functional. The CP/M Plus that the 128 runs may not be completely compatible with the CP/M used by the cartridge. I have heard that there are many CP/M cartridge compatible programs that will not run on a 128.

Be aware that NO manufacturers are supporting or plan to support GCR disk format. Some public domain software may be available in the 1541 format. I believe Poseidon Electronics still carries its PD programs in this format. More on them later.

The 1571 disk drive can read a wide variety of 5¼" disk formats, including its own, Osborne double density, Kaypro II and IV, and Epson QX-10. Since it can read all these formats, the 1571 is a great advantage when you start looking for software.

When searching for software that works, you should know that the 128 emulates a Lier Siegler ADM-3A or ADM-31 terminal or a Televideo 925. Programs that can be set to these terminals configurations may well run without further modifications. Most Osborne 1 software is set to this configuration and I've found that many of the programs I have do run well.

Surprising Correspondence

In an article I did for one of the Commodore magazines, I made mention of the fact that Osborne software seems to run well "right out of the box." The magazine was kind enough to run my address and so I immediately received letters from folks who had tried running programs like SuperCalc and WordStar. Some letters indicated that the folks had Osborne 1s. Their attempts to run copies of the original programs sold with the Osborne weren't working. Sure enough, I had purchased upgrades as they had been released and on checking my original copies, some did not work. Since the programs were not represented as being 128 programs when sold, the Osborne owners couldn't ask for the manufacturers help in getting them running. So these nice folks wrote to me.

While I sympathize with them, I must in all honesty say that they got what they paid for. It is certainly true that it would be nice if all the Osborne programs ran on the 128, but even if they did the license agreement that came with the software prohibits using it on another machine. I'm sure the folks who wrote me had the best intentions and some even said they planned to buy new copies of the programs had they run properly. Mixed in with these nice folks were a few rascals, however. One writer said he wanted to get the install program to modify "his" TRS-80 version of WordStar that he got from the computer at the college where he works. Another wrote to ask why the Osborne Executive version of WordStar that he got from a friend wouldn't run on his 128 and wanted me to help him modify it to get it running. These are two examples of letters I've received asking me to do something that is clearly against the law.

While I did report that many programs currently available for certain computers do run, that is not a wholesale invitation to start distributing stolen software. Folks, I would love to see these companies start selling 128 versions of their programs. This will never happen until 128 owners start demanding LEGAL copies of the software. I hope to use this column to let you know where you can get legal copies of good software.

Two companies that I know are supporting the 128 are NewStar Software and Kamasoft.

NewStar markets NewWord, the word processor that I've been using for the last three

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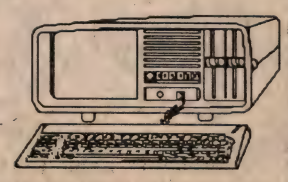
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Inside Commodore
continued from page 131

to registered PPD users first, then to *Computer Shopper* readers.

If you register your copy of PPD, you will get some other files along with the latest revision. This includes things like the PPD installation program that automates the customization process. I also plan on including some selected Public Domain files that will enhance the basic performance of PPD.

PPD Printer Cables Available Soon

Several reders have expressed an interest in the possibility of a kit of parts or a preassembled version of the User Port to Parallel printer cable. I will be offereing such kits in the very near future. If you are interested in this, please contact me at the address above.

Jim Klitzing's "Next Wedge" — Public Domain Treasure

Jim Klitzing has created a real masterpiece for C-64 users; his "Next Wedge" utility program. A concise description of "Next Wedge" would be something like: "THE ultimate utility program for the C-64". It has so many different features, that it's hard to describe them all.

First, take a machine language monitor (like Micromon), a word processor, an extended DOS Wedge (with a SEQ file reader/printer), a disk sector editor, and a good BASIC "Programmer's Aid" utility. Then, link them so they can all work together, at the same time. Finally, write them so that they will hide under BASIC ROMs until you need them, and so they don't take any RAM away from BASIC. With all that, you *might* have a package that's as good as "Next Wedge", because it includes all the above features, and more besides!

A slightly enhanced version of "Next Wedge" is available tha adds even more features. It includes such extras as hi-res graphic screen loaders and viewers for "Doodle" and "Koala Pad" screens and a built-in dumb terminal mode! (Figure # 1 shows the built-in help screen that smmarizes all of the "Next Wedge" commands.)

"Next Wedge" is not only one of the best software utilities I've ever run across, it's price is even better...IT'S FREE! In case you don't already have a copy of this program, I strongly suggest you get one. It's available from most user groups, PD libraries, BBSs, and the Commodore SIGs on CompuServe and Delphi.

With the author's permission, "Next Wedge" will be included as an "extra" on the registered PPD disk. It works in perfect combination with PPD (including the IRQ buffer mode). Together, the two programs allow you to exercise full creative power over your parallel printer. With "Next Wedge" and PPD, you can easily do word processing, BASIC listings, and lo-res screen dumps to your printer. If you have a Star or Epson printer, you can also do hi-res screen dumps and print out the "Doodle" or "Koala" generated pictures.

You may be asking yourself, if "Next Wedge" is so great, then why is it Public Domain? That's a good question. Jim Klitzing has been very generous to Commodore users in the past. Before "Next Wedge" he has written two top-notch full screen text editors/word processors for the 64, and made them public (including the assembler source code). So, maybe "Next Wedge" is his attempt to top himself!

Jim's benevolence was recently abused by some opportunisttic software hawkers (not hackers!). A certain software house that is notorious for "marketing" public domain software as their own work, took Jim's "Next Wedge" and burned it into a ROM cartridge for the C-64, without his knowledge or permission. From what I understand, Jim went to a software dealer and saw is program on cartridge staring him in the face! The cartridge is now selling for about $15, with none of themoney going to Jim. (You'd think if they were going to steal his software, they would at least give him a small royalty!)

This is one reason that "Shareware" type programs are becoming more popular (as PPD now is). It gives the author some means of legal recourse if their program gets "plagerized'. Jim has to be seriously thinking about distributing future versions of "Next Wedge" as "shareware" to protect his work. The program is definitely worth protecting! But, Jim hasn't said much on the issue. Last anybody knew, he was busy hacking away at his latest project: "Next Wedge 128" for the

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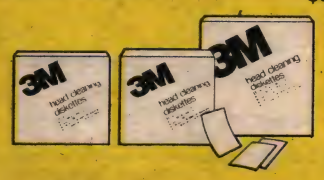
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Epyx has announced the introduction of a new utility kit designed to enhance the Commodore 64 and 128 computers while making them even easier to use.

Among the features included in the Vorpal Utility Kit is a head realignment utility for the Commodore 1541 disk drive. With this program, many problems associated with head alignment can be remedied without taking the disk drive apart or to a service technician.

The File Recovery Utility is a powerful tool that recovers lost or damaged files, a valuable utility for anyone who has data or programs stored on a damaged disk or who has accidentally erased a file and would like to get it back.

The kit also includes the Vorpal Save and Load feature which allows Commodore programmers to incorporate the Vorpal Fast File loading utility into their own programs. When created under the Vorpal file format, programs can load up to 25 times faster than before.

Other features, such as the Fast-Formatting and Fast-Disk backup utilities, substantially reduce the time it takes to format and copy disks.

The Vorpal Utility Kit is available now from retailers of computer software and accessories at a price ranging from $24.95 to $34.95.

For additional information contact, Epyx Software 1043 Kiel Court, Sunnyvale, Ca. 94089; (408) 745-0700

Mention that you read about it in *Computer Shopper*. ●

Inside Commodore continued from page 133

C-128 mode! (What's he going to do when he gets his hands on one of those 512K RAM packs?)

The Plus/4: "Lemmon Loser" or The Next "TI-99/4A"?

In my last article, I warned everyone to beware of the "Plus/4 Blitz" that was sweeping the country. As you have probably notice, tons of Plus/4s and C-16s are showing up for sale at closeout prices. Many unscrupulous merchants have been trying to sell them as C-64 or C-128 compatible computers.

Most of the advertisers I've seen in the *Computer Shopper*, have usually made it clear in their ads that the Plus/4 is incompatible with the C-64. Unfortunately, a good number of people have already bought these things, only to later find out that instead of getting a really "good deal", they've ended up with a machine that doesn't run the vast majority of Commodore software on the market.

What I failed to mention, however, is the "other side" of the picture. After some considerable evluation of the Plus/4 situation, I've come to the conclusion that a lot of people who are on the lookot for an inexpensive home or small business machine, might do well to consider a Plus/4 (*as long as they understand its limitations*)! In fact, there's a real possibility that the Plus/4 might just hold on well enough to become the next TI-99/4A—an "orphan" computer that refuses to die.

Here's what changed my mind: A few months back, I had a friend who was looking for a inexpensive computer system that he could use to do some personal wordprocessing and family budgeting. He didn't care what brand or compatibility it had, as long as it did the job. He asked me for some recommendations of a workable system that would meet his needs. I recommended that he get a C-64 ($150), EasyScript ($40), a 1541 drive ($180), and an 803 printer ($120) for a total price (at the time) of $490. (Some mail order dealers have similar packages for even less money.)

My friend said that was a little beyond his budget and that he's thinking of a maximum of $300 or so. A few weeks later, he called to tell me that he had just seen the Plus/4 was selling for under $100. Some dealers, (like C.O.M.B.) had a complete Plus/4 package deal that would fit in his $300-350 price range. My friend wanted to know, if I thought he should buy one. I replied with an answer that was similar to what I said in last month's column. (Not C-64 compatible, limited software, etc.) So, he decided, on my recommendation, to wait a while longer ("for prices to drop more").

"Script/Plus"—A Productivity Wordprocessor

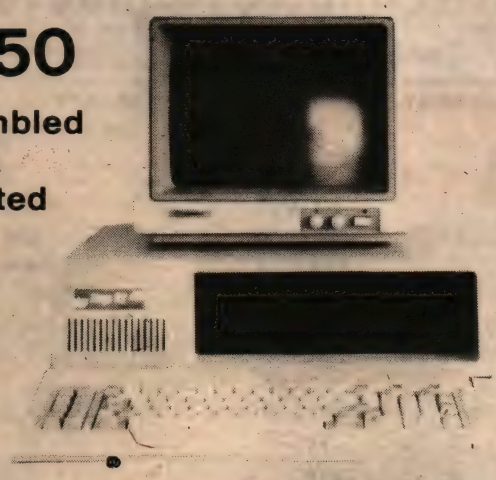
A couple of weeks later, I happened to be at a local store who was liquidating some of their Plus/4 software. While looking through the stock, I happened to run across the "Script/Plus" wordprocessor for the Plus/4. (That's the expanded version Commodore has been selling, not the built-in one.) I began to read program documentation (just for fun) and was surprized to discover that "Script/Plus" looked like a fairly decent word processing program, from the descriptions in the manual. So, I decided to do a little research on the program and find out more about it.

It turns out that "Script/Plus" was written especially for the Plus/4 and C-16 (same program runs on both machines), by Precision Software. That's the same British software house that wrote "EasyScript" for the C-64 and "SuperScript" for the PET/CBM and C-128. It's an "upward compatible" revision of EasyScript/64, so if you already know EasyScript, you would have little trouble runnig "Script/Plus" and the text files between the two are com-

continued on page 140

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Parallel Printer Driver
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ed into the top of free BASIC RAM, "wedged" into the KERNAL, and protected from BASIC. (You don't need to "SYS" to any particular location, this is done automatically when the program is RUN.)

The PPD ML driver code is approximately 1.5K long (depending on the revision). After installing the driver, you should have about 1.5K or so, less BASIC RAM free. You can verify this by "PRINTing" the number of bytes "FRE(N)" before and after you run PPD. When properly installed, PPD prints a "sign-on" message that looks like this:

PPD (3.0)-START ADDRESS:
xxxxxx (HHHH)

The letters "X" and "H" shown above will be decimal and hex numbers displaying the actual "installation address" (or first byte) of where the program has been relocated in memory. The starting location of PPD may vary, since it's auto-relocating. Normally, you can ignore the starting address displayed in the sign-on, unless you need this information for technical reasons (described later).

After installation, the printer channel is re-routed from the Commodore serial bus to the User Port interface. The BASIC OPEN, PRINT#, CMD, and CLOSE commands (and their KERNAL counterparts) will operate using their normal syntax. Most BASIC programs (and many ML programs) can then send their output to the parallel printer. (For specific information on how to use OPEN, PRINT, CMD, and CLOSE commands to control the printer channel, please refer to the C-64 User's Guide and Programmer's Reference Guide.)

A couple of important hints to remember when using the PPD interface: If you are CLOSEing an OPEN printer channel, always do a "PRINT#4" to empty the printer's internal buffer, first. Failure to do this may result in lost data (and other messy things).

Also, when running PPD, you may find, on rare occasions, that the printer "hangs up" in an unresponsive state. To correct this, toggle the printer's "on-line" switch on and off. This usually clears the "hang." If not, toggle the printer power switch on and off. If still not cleared, PPD probably has been corrupted and needs to be reLOADed.

Special Features And Second Addresses

Most Commodore printers allow you to set the "printer mode" by specifying different second addresses, during an OPEN command. For example, OPENing a 1525, 801, or 803 printer with an "OPEN 4,4,0" puts you in the normal "cursor up" or uppercase text and block graphics mode. OPENing with an "OPEN 4,4,7" will put the printer into the "cursor down" mode where you can print both upper and lower case text (but no block graphics).

The use of second addresses provides a convenient mechanism to control PPD's advanced features from BASIC (or the KERNAL). The OPEN command syntax for PPD is identical to that for Commodore printers, but also includes several new additional modes and second addresses. These new modes and addresses are summarized in Table # 1, which can be found at the end of this article.

As the table shows, there are four basic modes: PETSCII, ASCII, Transparent, and "Hex Dump." Three of these modes actually can be invoked with one of two different second addresses. Two other options (lock mode and buffer enable) may also be specified during the OPEN command.

PPD's new second addresses were designed to be as compatible as possible with both existing Commodore printers and the popular "CardCo" serial bus interface. This increases the software compatibility of the interface. A

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First C-128
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years. It's a WordStar 3.3 clone that has a few added features that make it a real standout. It has an undo command and handles column formatting to make it easy to do newsletters and similar writing. At $125, it's probably the best deal in the CP/M world. The company offers updates at reasonable prices and has been most responsive when I've had questions in the past. *Computer Shopper* ran a review of NewWord in the May 1984 issue.

KamaSoft markets Kamas and Out-think, outline processors of the Think-tank variety that run under CP/M, instead of MSDOS. Hardin Brothers did a review of KAMAS in the January issue of *Computer Shopper*. Out-think is the follow-up to KAMAS. While KAMAS was an outline processor with a programming language, Out-think is an outline processor with a text editor. Both are available in 128 versions. KAMAS is $147. Out-think is $49.95. *Computer Shopper* will probably be running a full review of Out-think in this or a future issue.

Public Domain

Poseidon Electronics is selling PD software for about $15 per disk. You can get their catalog by sending a dollar and a self-addressed stamped envelope to: Poseidon Electronics, 103 Waverly Place, New York, NY 10010.

I recommend the programs VDO and NULU. Poseidon is also a source for the NEWSYS program, for those who want to avoid on-line hassles.

Future Columns

If you have any questions about CP/M on the 128 please direct them to *Computer Shopper*. They'll forward them to me right away and I will attempt to provide answers here in the column. If any of you would like to recommend products or companies that you feel should be recognized via the column please write and let me know. The more information we can get out there, the better off the CP/M and 128 world will be.

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Online! Amiga Communications Program

by Ervin Bobo

Perhaps the most-wanted accessory for the Amiga is the Transformer software and the companion 5.25 floppy drive, so that the user will be able to avail himself of MS-DOS software. No matter that this is like transforming a Ferrari into a Honda Civic, people want it almost in spite of themselves.

The bad news is that Commodore's Tranformer isn't here yet; the good news is that by the time it arrives it may be unnecesary. As an example, why spend an additional $500.00 to be able to run Crosstalk or Smartcom when you can run Online for just the cost of the program ($69.95) and have a communications program that has been especially written to take advantage of the Amiga features and operating system?

With Online, Analyze and (by the time you read this) Scribble, Micro-Systems software is making a fair bid to become a premier producer of serious productivity software for the Amiga. While other larger and better-known software producers are busily porting Commodore 64 games to the new machine, Micro-Systems is doing the equivalent of an end-run and is quietly proving that the Amiga is a lot more than a game computer.

Online boots immediately after Kickstart because it resides on a Workbench 1.1 disk. And because it resides on Workbench, it can be easily copied to another floppy or installed on a hard disk. It is a good idea to make a working copy right away, not only for the usual archival purposes, but because you'll soon be writing a lot of information to the disk. Keeping the original clean of this information means that, if a subsequent copy need be made, you won't have to do a lot of editing and deleting of old files.

Even for the first time user, Online is easy to use. Default support is for the Hayes and Hayes-compatible modems which seems to cover most modems in use today, and so it is possible to select Call from the Service pull-down menu, refer to your Hayes quick-reference card to remind yourself how to dial a number, and be on-line in just minutes.

This is, in fact, how I first used Online because one of my criteria in evaluating software is to find how far I can get without reading the documentation. In this case, I managed to get to Fall River, MA and uploaded a file to a friend. Next day, I began reading the book.

Like other documentation from Micro-Systems, that created for Online is clear, concise and should be understood even by the novice. In addition to this, there is enough humor to get you over the dry spots, but not enough to make a serious student feel he is being distracted.

continued on page 176

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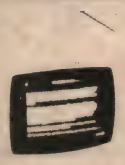
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brief description of each mode follows.

Carriage Returns And Linefeeds

Three modes have two different second addresses each. This gives you the option of OPENing a mode to automatically add linefeeds (LFs) after every carriage return (CR) if your printer needs it. (Most ASCII printers do.)

For example, OPENing a printer channel with a second address of "0" selects the PETSCII mode with added linefeeds (LFs). OPENing a printer with a second address of "1," invokes the exact same mode, PETSCII, but no extra LFs are added. Except for adding LFs after CRs, the two second addresses invoke the same mode. This is true of the two other modes that use two second addresses. (You may also add LFs automatically by OPENing the printer channel with a logical file number that's greater than 127.)

PETSCII Mode

This mode is also known as the "cursor up" or uppercase mode. It's called the PETSCII mode because no "PETSCII to ASCII" translation is done. It's main use is for LISTing BASIC programs. (This was the only mode earlier versions of PPD had.)

Since characters are sent to the printer without much modification, most uppercase text sent to the ASCII printer will print correctly. This will match the C-64's screen, when it's in the uppercase/graphics mode (the default mode on power up).

But, the Commodore "block graphic" characters and uppercase text sent to the printer will probably be ignored and certainly not printed correctly, due to PETSCII/ASCII incompatibility.

When the upper and lower case screen is used (toggled with the Commodore and Shift keys), text on the printer will be printed in reverse from the display on an ASCII printer. (Upper case is printed as lower and vice versa.) To correct this problem, a new mode, the ASCII mode (described below) is provided.

Some word processing programs that do their own internal PETSCII to ASCII translation should probably use the PETSCII mode, instead of the ASCII mode. Otherwise, if you select ASCII translation in both the word processor and the interface, you'll probably end up with "reversed" text characters again. You may have to experiment with this mode if you are experiencing troubles.

ASCII Mode

The ASCII mode is similar to the Commodore lowercase or "cursor down" mode. It's selected with a second address of 7 or 8 (with or without linefeeds). It's like the PETSCII mode, but all text characters are first converted into the upper and lower case of "true" ASCII. Text that appears in lower and upper case on the C-64 screen will then be printed properly on the ASCII printer.

This mode can be used to print text directly from a word processor without ASCII translation first, or whenever you want both upper and lower case letters. The PETSCII mode limitation on printing Commodore "block graphic" characters also applies to the ASCII mode.

BASIC Listing Feature

PPD 3.0 also includes a "BASIC listing" feature. This feature makes it possible to LIST normally unLISTable Commodore BASIC programs on ASCII printers.

Within a BASIC listing, the special graphic characters (like the "reverse heart"), are translated from their graphic form into a two character abbreviation within "curly brackets." These two letter abbreviations and their interpretations, are summarized in Table # 2 (also found at the end of this file).

Whenever either the PETSCII or ASCII mode is selected, this BASIC listing mode is automatically activated. However, it can be switched off by making a custom "locked" version of PPD, (described later).

Swapping CHR$(15) And CHR$(20)

Most dot matrix printer, (including Star, Epson, and Commodore) use CHR$(14) as a command to switch to double width characters. This is one of those rare control characters that most printers seem to have in common.

In order to switch back from double width to normal width printing, Commodore uses CHR$(15). Most other printers (Star, Epson, etc.), use CHR$(20) instead. Therefore, in the PETSCII and ASCII modes, CHR$(15) and CHR$(20) are automatically "swapped" by PPD.

This allows software written for Commodore printers to switch back to normal width printing with non-Commodore printers. This automatic swapping, like the BASIC Listing feature, can be overriden with the customization process described later.

Transparent Mode

A second address of 4 or 5 selects the "transparent" mode (with or without extra linefeeds, respectively). In this mode, all data is sent exactly as received, with no translation whatsoever.

The "BASIC listing" and "swapping" of CHR$s 15/20 described earlier are turned off. If the "add LF" mode is selected, however, linefeeds are still added to carriage returns.

You can use this mode whenever you want to send binary data straight to the printer without modification. For example, this mode is often used by graphics programs when sending high resolution graphic information to the printer.

Hex Dump Mode

A special "hex dump" mode is turned on by OPENing the printer with a second address of 3. All other modes are overridden when the "hex dump" mode is invoked. This mode automatically converts all characters sent to the interface (including LFs, CRs, and any other control characters) into their hexadecimal ASCII equivalents. This information is then sent to the printer.

This allows you to examine the actual binary data being output. It's primarily used to diagnose compatibility prob-

Program on page 169 continued on page 174



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Inside Commodore
continued from page 134

patible. After a little more investigation, I've decided that "Script/Plus" is at least as good as EasyScript for the 64, and maybe even better.

First of all the program is on cartridge (like we always were promised "EasyScript/64" would be). Because of this, the long loading time from a software protected disk is eliminated. Second, it has lots of extended features: row and column calculation (like a mini-spreadsheet), and two document areas (in memory together at once). It even supports a parallel printer off the Plus/4's User Port (a program after my own heart!). Finally, "Script/Plus" has a text buffer about twice the size of EasyScript/64.

After reading this documentation, I had to admit that my bias against the Plus/4 wasn't based on objective evaluation of it's software, as it was on the strong publicity it's limitations have received. I'm still not saying that I would rather have a Plus/4 than a C-64 or C-128. But, I do think it does have a place, especially for those who are on a tight budget and can live with its limitations.

Support for the "Plus/4"

Support for the Plus/4 doesn't appear to be lacking, either. I've found out that "Script/Plus", and many other programs, are still available directly from Commodore at discount prices. This includes about 50 titles like "LOGO", "ZORK" (I,II,II), "Calc/Plus Spreadsheet" (with graphics), "Hitchhiker's Guide to the Galaxy", the "Personal Finance Decision" series, "Jack Attack", "Typing Professor", and the complete InfoDesigns accounting system.

Almost all the more popular C-64 programs are available from Commodore for the Plus/4. (Why Commodore didn't have this much software in the stores with the Plus/4's originally is a mystery. If the software had been there, they might not be closing them out now!) For more information on what titles are available and prices, contact Commodore Direct Marketing (address at end of article).

Tri-Micro, the developers of the Plus/4s "built-in" programs, is also continuing to support the machine. Several of their new game/productivity programs for the 64 and 128 are also being translated to run on the Plus/4. They also started a monthly newsletter specifically for Plus/4 owners called *Plus Exchange*. You get more information on this by contacting Tri-Micro (address at end of article).

Some New Books For The Plus/4

Yet another "late break" in the Plus/4 saga, has been the recent appearance of some decent programmer's documentation for them. (Again, too late to save the machine from extinction.) The "Programmer's Reference Guide for the Commodore Plus/4" is not an "officially sanctioned" version from Commodore. Instead, it appears to be an independent effort, published by Scott, Foresman, and Co.

It's very well done and provides the most in-depth technical information on the Plus/4 that I've ever seen. If you ever plan on doing serious software development on these machines, it is an invaluable reference. (Check for it at your local bookstore or look up Scott, Foresman, and Co.'s address in the latest "Books In Print" directory.)

Howards Sams Co., has also recently published one of their "User Guide" type books, "The Plus/4 Owners Handbook". It doesn't provide anything beyond what's available in the regular Commodore User's Guide, but it's an interesting introduction to the machines with some helpful hints for new owners. For more info contact Sams (address at the end of this article).

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Inside Commodore continued from page 140

C-64 Power Supply Problems — An Update

One of the most common service problems of the C-64 (according to Commodore service technicians) is the failure of the C-64s wimpy power supply, and the resultant damage it does to the internal chips. In the November '85 issue, when I wrote about getting service for your Commodore system, I mentioned some things about the C-64 power supply, which need correction and further clarification.

First, I said that the C-64s power supply was "potted" with a rubber-like potting compound. That's wrong. It's actually potted with a rock-hard, grey, epoxy compound. Second, I said it was unrepairable. That is also wrong. I have heard from two independent sources that it is indeed repairable...if you want to crack open the plastic case, break into the epoxy blob, and replace the defective components (usually the 7805 IC, a +5 volt regulator).

Lastly, I said that the Maxtron replacement for the C-64 power supply was repairable. The implication was that you could open it up and fix it if it broke. I understand, now, that you can't. A dealer who has carried the Maxton part for quite a while (and claims that it is a superior replacement for the standard C-64), wrote and informed me that it is also potted and "unrepairable."

More Service Hints for Your C-64

One of our readers, Jess Peeler (from Costa Rica, by the way!), has written about this power supply problem and given us a lot of really good hints on servicing C-64s:

"The following is based upon repair of approx. 50 C-64 computers: The 3 major problems found are the (failure) of the 6567 VIC, the PLA (82S100), and the power supply...It is worth noting that almost none of the smaller, easily obtainable 74LSXX logic chips go bad... Minor problems (include): Power switches, power jack, internal voltage regulators (7805, 7812) burn out, and keyboards fail. (Open the keyboard and clean all contacts with isopropyl alcohol — problem solved.)

(When) RAM chips (one or more) occasionally burn out ... this is the warning signal that an external power supply is bad or intermittent. (Note: Also be on alert if you lose your sound. This is a signal that SID has been wiped out...RAM is next! — Ted) Don't wait — replace or repair the power supply, even though the +5 VDC appears correct! If you replace the burned RAM(s) and run with the same power supply, it'll strike again and wipe out another 1-5 RAM chips and that smarts!! (...a runaway power supply can put 13-16 volts on the 5 volt bus and wipe out delicate RAMs, but the hardier TTL chips seem to survive.)...

Commodore's early power supplies were made so one could get inside and inspect or repair with ease. They have a case which is vented and they don't ever seem to go bad. Commodore's later power supplies — the majority in service were designed by an evil genius and they go bad often. All parts are potted in a solid grey rock-hard epoxy block...which yields only to a hammer and chisel. Even the 5A series fuse in the 9 volt A.C. line is imbedded down inside the epoxy (Aargh!!)"

Jess Peeler
Costa Rica, Central America

Mr. Peeler explains that his computer repair center, because of the very high price of import duties on spare parts, finds it economically necessary to re-build, rather replace most defective C-64 power supplies. In fact, he sent detailed instructions of how he smashes into the C-64 power supplies and fixes them. (We may publish this sometime in the future.)

Two New Service Books From SAMS

Speaking of servicing your own machine, here is some helpful information: Howards SAMS and Co., have been at it again and have recently reles-ed two more excellent service manuals for Commodore equipment. The C-64 Trouble Shooting and Repair Guide by Robert Brenner, and The 1541 Trouble Shooting and Repair Guide by Michael Peltier are "must haves" for service technicians and others who are interested in repairing their own machines.

Michael Peltier wrote an earlier 1541 service manual that I mentioned in this column (many moons ago). That book appears to now be out of print. His new SAMS book, however, is just as good as the old, if not better. It contains information on the hardware of the 1540 and 1541 drives that is just not available elsewhere. His manual fully explains the repair and alignment of 1540 and 1541s. He even includes information on how to construct some inexpensive alignment tools. Robert Brenner's book is similarly well done.

Each of these manuals includes excellent and detailed troubleshooting guides with full schematics, parts lists, servicing hints, and technical tips. Both books use the "cookbook" approach to troubleshooting using flo charts, detailed diagrams, and numerous cross-references. This really simplifies and speeds up the process.

Each book includes information on the various versions of both the C-64 and 1541, so both new and old models are covered. The manuals are worth their retail price of $18.95 several times over. (Especially if you can save the high cost of having a service technician fix your machine.) For more information, contact your local bookstore or the SAMS address below.

Product: Plus/4 Software: Commodore Direct Marketing, 1200 Wilson Drive, West Chester, PA 19380.

Product: Plus/4 User's Guidebook, Commodore Technical Repair manuals: Howard W. Sams and Co. Inc., 4300 W. 62nd St., Indianapolis, IN 46268.

Product: Plus/4 Software: Tri-Micro, P.O. Box 11300, Santa Ana, CA 92711. ●

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Commodore Rebirth? continued from page 65

readers who wanted me to know how they felt about piracy and software vendors. Most included in their letters the type of computer they were using and the purpose to which it was put. In almost every case, they owned the relatively inexpensive Commodore computers and were using their computers for word processing, data base management, bookkeeping and education. And like the frugal Americans that they were, each had found more ways to use their computer than they ever expected.

My recently ended association with Viewtron brought me in contact with a few hundred more home computer users. For the most part, Viewtron's subscribers were home computer users. I spent many an hour chatting with these folks about their computers and what they liked or didn't like about them. Again, the majority were Commodore 64 or 128 owners.

Oh yes, there were questions about how to play Zork or Hitchhikers Guide to the Galaxy, but most questions dealt with how to get the most from their new printer or modem. The Bulletin Board Network there was a hodgepodge of questions on using peripherals with the Commodore equipment and what software or peripheral would be best suited to a particular user's needs.

Articles I've written about the C-128 generated letters from computerists just starting to realize the potential of their "toys." Many had specific questions about using CP/M on the 128. Most lamented the lack of CP/M software being advertised for the C-128. All complained about Commodore's disconnection of their toll-free number for user support.

All this contact has shown me one incontrovertible fact. The home computer market was, and still is, far from dead. The buyers have been there, waiting in the wings. It was the product that was missing. Software vendors, complaining of "piracy" and "falling sales," developed little that was new or exciting. Wallowing in self-pity, brought on by carelessly researched market projections, many vendors chose to take a "wait and see attitude" towards their customers and the customers responded by returning the favor.

Even now, an impromptu survey of software developers conducted weeks (March 15-29) showed that promised Amiga products are more than 6 months behind in development. Some companies have put their software on indefinite hold, claiming that until the Amigas start selling they have no market for their products. The wary customers are not buying because there is no software to run. The one thing the Atari ST is not suffering from is a lack of software.

As justification for neglecting the potential markets, software companies cite the industries failure to meet "projections." The television industry took decades to get to the point where there were television sets in the majority of U.S. homes. Ten years is a ridiculously short time to put a computer into every home. Computer industry analysts were predicting a computer in every home by 1990. Needless to say sales figures fall far short.

Even so, the 1980 census listed only 400 million households in the US. Commodore sales figures back in 1984 showed over 30 million computers sold. With Atari, Apple and IBM claiming sales in the tens of millions, as well, what right has any company to complain that volume hasn't met their expectations.

Pricing was another problem, until the Atari/Commodore/Apple/Texas Instruments price wars began. As the prices came down, the number of buyers went up. In almost every case, the company marketing a computer sets the price as high as they think the market will bear and gradually reduces it as long as sales remain slow. In the past price breaks, special sales and "freeby throwin's" have gradually brought the sales up. Until 1985, that is. I can't tell you how many times I heard "I want to buy a computer, but I'm waiting for the new models that have been announced. I want to get the most for my money."

Much of last year's "slump" was caused by the uncertainty of waiting for announced machines to arrive. Many people were waiting for the industry to take its next step. Commodore enthusiasts were especially hard hit by the "wait til you see what we've got for you!" syndrome last year. The C-128 was late being delivered; and the Amiga took its time showing up in the hands of reviewers. Many potential buyers didn't know which of the two they wanted.

The Apple Macintosh was selling, but only to those who had a pressing need for the computer and couldn't wait to buy. Many of those who did buy Macs felt cheated when Apple announced upgrades and improvements that gave them no price breaks at all for taking a chance on untried machine with little software available.

When the Amiga finally became available, Commodore couldn't keep up with the demands for C-128s. Yes, the purported "business/personal" computer Amiga, was drowned in requests for the "personal" computer C-128. Commodore was surprised, but not me.

Why?? The biggest single factor in the whole mess was that the consumers wised up! Instead of buying "a computer," potential customers looked for a tool. They had a much better idea of what computers were about and how to

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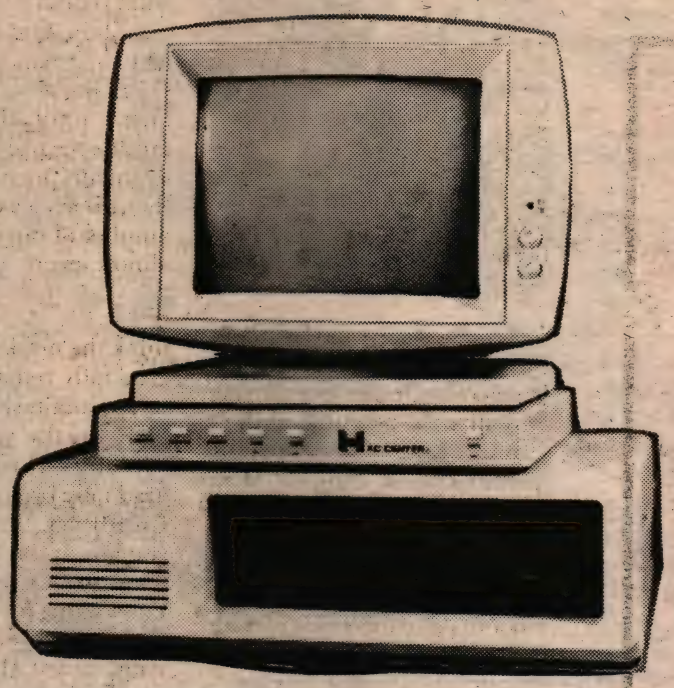


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Aegis Images/Animator

Reviewed by Erv Bobo

Aegis Development's Images is terrific as a standalone painting and drawing program, and when paired up with Animator it simply cannot be beaten by anything now on the market.

Residing on a Workbench 1.1 disk, Images can be freely copied to either a floppy or a hard disk and, in fact, should be, for this will allow you to put away your master copy where it will not be accidentally written to or erased. Use the standard Amiga Diskcopy routine.

Booting immediately after Kickstart, Images presents you with the familiar Workbench window, complete with the System and Preferences drawers. Preferences, of course, will be used to set up the drivers for your printer and when doing this don't forget to set up the Graphics Select parameters.

If you've not yet used a printer with any of the Amiga graphics programs, be advised that the Grey Scale selection, while it can result in a knockout black-and-white rendition that turns your colors into shades of grey, will make short work of your printer ribbon. Until you're ready to print a masterpiece, I'd suggest using the black-and-white option. For color printing, I've used and can recommend the Epson JX-80 and the work I've seen from the Diablo Ink-Jet looks even better - it should, for the difference in price.

Like all such graphics programs, Images requires 512k of RAM and once you get into it, you'll see why. If your only experience so far has been with programs such as MacDraw and GEMDraw, you have a number of surprises coming. While it can be used with a single disk drive, using a second drive to hold a data disk will eliminate disk swapping, thus allowing you to concentrate on the creative aspects of the program, rather than the mechanical.

On the black screen before you, a window shows a Fast Menu; this allows rapid point-and-click selection, but is probably better used once you've become familiar with the program. For right now, drag your cursor to the command bar and click the right mouse button to see the pulldown menus. These are the same commands you saw in the Fast Menu, but here they are much more extensive.

The Project menu allows you to save, load or print a picture as well as adjusting the color palette. Next to it, the Edit menu allows you to Undo your last brush stroke, clear the screen, create a frame or magnify a portion of the work screen. Magnify allows you to work on a small section of your picture one pixel at a time, while Frame allows you to delineate any portion of a painting and save it for later use as a brush or move it to another part of the current picture. As a Frame, it can also be moved to Animator and be used as a background or foreground object. As if this weren't enough, the area bounded by the Frame may be rotated through 360 degrees.

Next in the line of menus is Special Effects. Here you can turn on Mirrors, for symmetrical drawing along the vertical, horizontal or diagonal - or all three at once. Within this same menu, you can choose Wash, a technique that causes adjacent colors to bleed together; or Smear which does just what it's name implies, and to good effect.

Here, too, you can cause a range of colors (selected from the palette) to Cycle within your painting and this can be used as an elementary type of animation.

A sub-menu to Special Effects shows Pantograph, which copies an area of the painting to another area; Under, which allows you to paint under existing lines or forms; a Grid superimposed on your painting for greater precision; and Spread, which causes the Fill command to use a range of colors rather than the usual single color.

Add to these the color palette, where each color can be adjusted for hue and intensity by slider bars and which contains a variety of pre-made patterns which can be edited to taste; five fonts for adding text or titles to your work; a menu of shapes allowing you to draw freehand or to create a variety of geometric shapes; and a brush menu which shows a wide variety of brush styles and you have a drawing and painting program as complete and as easy to use as any on the market. You will, however, have to bring your own talent to the program and the sample paintings included on the disk will either inspire or intimidate you.

Now, suppose you do use Images and create a great painting of, say, a landscape? Beyond printing it, what can you do with it? Why, simply load it into Aegis Animator, use it as a background and create some animation for it.

Animator is one of the most original programs yet created for the Amiga and one of the most surprising. When you first see how you can draw a simple shape and move it about the screen, then think about how much code would

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Commodore Rebirth?
continued from page 142

use them. All those computer books and magazine racks full of "self-help" computer articles did their job. Of course, *Computer Shopper* was at the front of the wave of computer hobbyists who knew what they needed and wanted. For most home uses, the C-128 is an ideal machine. The price at which it is selling makes it a great deal. Getting three computers in one certainly adds to its attractiveness.

The absence of companies like Atari and Commodore from computer dealer shows and the appearance of computers in the mass market retail stores (KMarts and Toys 'R' Us) signaled the acceptance of computers by the buying public. While the industry saw this as the end of the home market, it was really the beginning. Consumers had become educated to the point of realizing that the "dealer support" they were supposed to be buying with their computer, didn't really exist. Once you walked out the door of a computer store, you were on your own. The dealers are the ones who did themselves in.

I quote one whom I know personnaly, 'I can't afford to give away the kind of support those customers want. My sales people need to be selling more computers, not sitting around teaching someone how to use the one they already bought. I make money by selling computers, not supporting them. Let the manufacturer provide support."

And how do manufacturers respond to that? It took Commodore less than three months to find out how much support they could afford to give away. That's how long it took for them to disconnect their toll-free number. They found that users would gladly accept any free help they could get. The rebirth per se is coming about as potential buyers accept that computer dealers are not going to give them any more help than the sales clerk at a toy store. These educated consumers have found that they needn't struggle alone to learn to use their computers. The place to find "support" is the local user group, an online information service or your favorite magazine. Rarely are any of these free, but when a buyer pays less for the computer, he has more money left with which to afford "support."

For instance, the two largest areas of usage on CompuServe in 1985 were the Micronetted Apple User Group (MAUG) and the Commodore Information Network (CIN). Running close behind those were the IBM, Tandy/Radio Shack and other computer specific special intertest groups. The Commodore operated CIN was one of the best places to find good solid support until Commodore decided to become partners in Quantumlink. The Toronto Pet User Group took over the area and Commodore was assigned a much smaller area in which to provide user support. The CIN continued to grow while their three former SIGs went steadily downhill.

By the time you read this, Commodore may once again be running its three former SIGs on CompuServe and will likely have announced their withdrawal from Quantumlink.

Viewtron, originally conceived as an electronic newspaper, was closed down March 31. It's parent company Knight-Ridder never intended to run the "information service" that Viewtron evolved into. In its last months, 40% of Viewtron's online usage was generated by Commodore users in the special interest groups. The half-completed download libraries, CB and bulletin board networks generated more income than all the previously installed services (shopping, banking and newspaper) that had been there for over three years.

The idea of being able to ask for help in your own home and receive it is one of the biggest attractions of computer use. Yet it is ignored or deemphasized by some computer magazine editors. Now it has been passed up by three major newspaper chains as well. The Boston Globe abandoned plans to start a videotex service in New England in 1985.

When Knight-Ridder realized that their electronic newspaper was a failure, they closed Viewtron down, abandoning thousands of computer and Sceptre terminal users. When it died Viewtron's usage was growing at the rate of 50% per month. It had over 20,000 subscribers, an active market that was growing at the rate of 1500 new members in the last week alone. Everyone of them is a "home computer" user.

Many of those I talked with in CB were new computer owners who had questions about how to use their computers. Because it wasn't in the computer business or the real-time communications business, Knight-Ridder chose to drop the service. Their explanation for closing included the large amount of money that they had at risk for the upcoming year and the board of director's determination that the $11 million dollars in Viewtron's operating budget could be put to better use.

One month before Viewtron closed down, Gateway—a videotex service in the San Francisco area run by the Times Mirror Group—closed its telephones. (After all electronic homes, don't really have doors do they?) The former Gateway users were referred to the Viewtron service to find a new home. As badly as I felt losing a home on Viewtron, I feel sorrier for the Gateway users who had barely settled in.

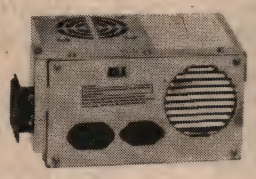
The online support networks being established by some computer product manufacturers show that this area of home computer buying is very active. And in the truest sense of the word the electronic networks that use modems and telephone lines are definitive of the HOME computer. People want to be able to use their computers at home. They want to be able to communicate with other users, friends and product representatives from home.

The home computer market is far from dead. The problem is the short-sighted corporate leaders who expect the home computer buyers to take all the risks. The computer manufac-

continued on page 148

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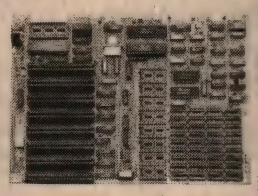
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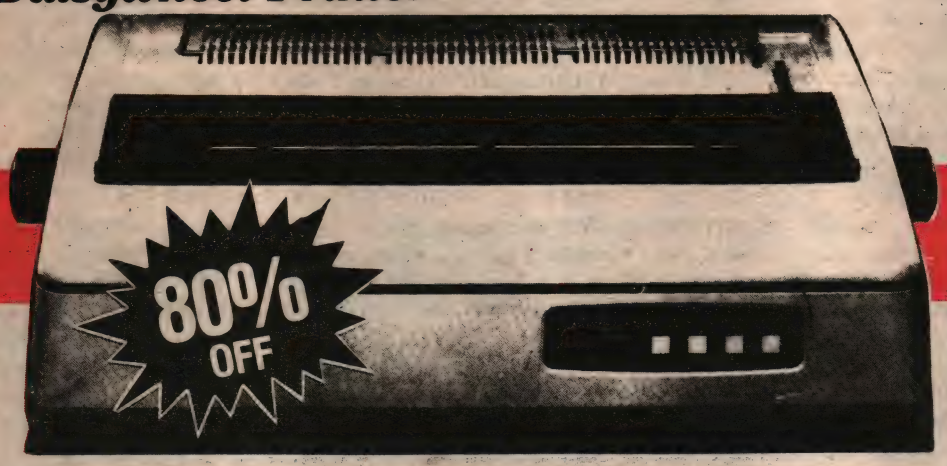
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SPECIFICATIONS

Print Speed: 40 cps bi-directional printing
Buffer: 2K Buffer memory
Number of columns: 136 (Pica pitch), 163 (Elite pitch)
Print spacing (min): 1/120 in.
Line feed spacing (min): 1/48 in.
Paper width: 15 in; Print area, 13.6 in.
Printing System: Static font impact system
Number of copies: Original plus 2 copies (0.2 mm thick)
Number of character types per wheel: 96
Fonts: Courier 10 standard, plus all other Diablo fonts
Pitch: 10, 12, 15, proportional
Interface: Centronics parallel
Power Source: 90-127 Volts at 60hz
Noise Level: Less than 65db
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It was made by TEC and is mechanically "similar" to the C.Itoh Starwriter F10-40, made by the same manufacturer. It has a reputation as being one of the best printers made. So how can we sell it so cheaply?

The answer is simple—like many computer products, this printer was sold by one company to another company, which put its own label on it. In this case, TEC sold these printers to Commodore, which intended to sell them with an expensive business computer they were developing. The expensive computer took a lot longer to develop than Commodore anticipated—so they were stuck with these printers. Then they tried to sell them with their inexpensive computers—and you can imagine the result. How many people do you think would buy a printer with a list price of $1795 to go with a Commodore 64? You're right. Very few.

So we were able to acquire a great printer, made by a company known for its high quality printers, with only one drawback—the Commodore label on it, which falsely suggests that it is a low end printer.

However, the label can be a real advantage should your printer ever need service. Service is available not only at many dealers who repair C.Itoh and TEC printers, but also at all the hundreds of Commodore factory authorized service centers, located practically everywhere!

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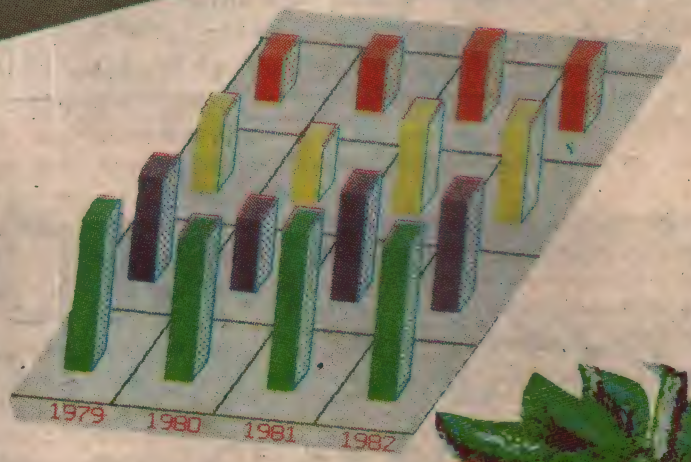
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Maximum characters per line: 80 chars per line standard, 40 chars per line enlarged
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Color hard copy: Data: horizontal 8 dot information; Resolution: 640 dots per line
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Commodore Rebirth?
continued from page 145

turers accuse buyers of being cheap or "not there" when inflated prices keep buyers out of the stores. Planned improvements and "any day now" new models keep buyers playing a waiting game. Fortunately for buyers, every day they wait is one more day to get educated about the products. Software vendors say they can't afford to develop products until there is an established market. But they expect consumers to buy the computers with no software. Third party hardware vendors actually take more risks than software vendors, yet they actively pursue the market.

The Commodore 128 would be doing much better if Commodore had given support to any of the vendors planning to develop CP/M software for it. Instead, Commodore has ignored the potential of CP/M and thrown all its efforts into convincing established Commodore 64 developers to support the 128 mode of the new machine. These companies need Commodore's help about as much as their corporate leaders need holes in their heads. The less known developers can't get even a "hello" from Commodore, let alone a price break on machine. While smaller companies will risk their time and efforts to come up with innovative products early in the life cycle of a computer's production, the larger manufacturers can't afford to risk their stockholders money until the machine is successful. Commodore has made a massive miscalculation by handing all their support to "established" developers.

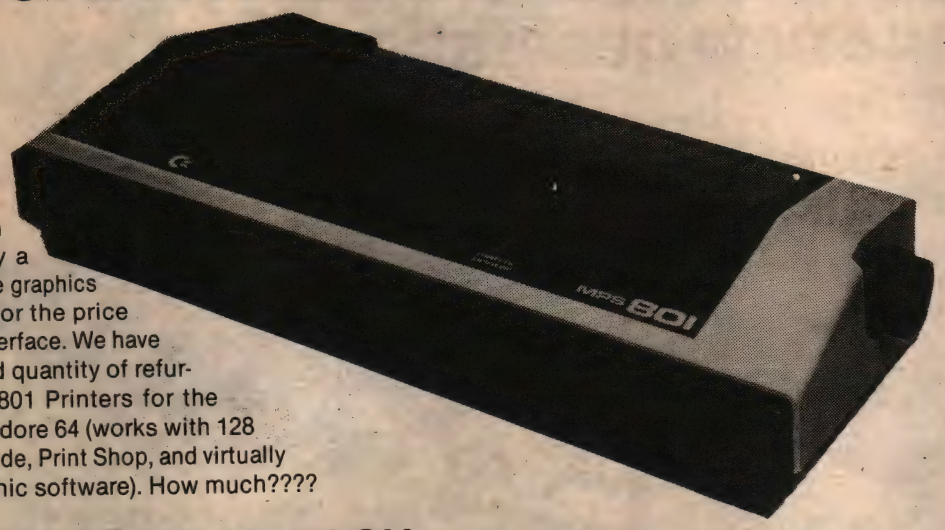
The Amiga is suffering from the same problem, and it isn't likely to get better, regardless of Commodore's plans to drop the price of the machine. When good software is available the machine will take off. Many potential buyers are just waiting for the software before buying. Jack Tramiel at Atari has really gotten a jump on Amiga because of Commodore's mismanaged advertising campaign and reluctance to help the small companies complete useful products.

As of this writing, there is not a single decent word processor available for the Amiga. Not ONE! The only one available is TextCraft by Commodore and it is barely tolerable from the reports I've received. As I haven't received a review copy from Commodore, I can't give an exact accounting of its worth. The other word processors, and several were in the works, have all been put on hold by the companies developing them. Predicted availability of these packages is June or July

While its new machines are attempting to find their market, many home users are buying a C-64 or 128 for their own use. These buyers plan to get another machine, either 128 or Amiga, as soon as the software arrives, and give the first machine to the kids for school work and entertainment. From my perspective, it looks like the homes that do computerize will be two or three computer families. Am I one of the multi-computer buyers???? You bet. And I think that this may soon become the norm for "home computerists!" ●

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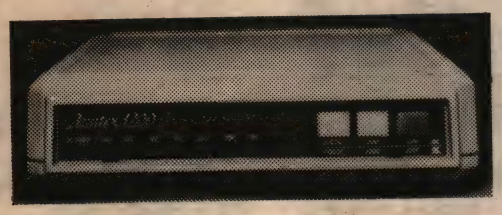


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Aegis Images continued from page 144

be needed to duplicate that routine on a real computer, you'll be amazed as well as amused.

Like Images, Animator requires an Amiga with 512k of RAM. It also resides on a Workbench disk and so can be copied, either to a floppy or a hard disk - in fact, the memory requirements engender some special copying instructions. On your duplicate, working copy (not your original! Go put that away!) you're instructed to go to CLI and, at the prompt, type "Execute NoWorkbench." Once this is done, your working copy will always boot to CLI rather than Workbench, thus saving some valuable workspace in RAM.

It is easy to overdo things and run out of memory. Before this happens, Animator will display a message saying "Memory Panic - System going down!" Before the system does go down, you have a chance to save your work so far.

Because it works from a battery of pull-down menus, with all routines built in, you can get up-and-running on Animator with only a minimum of instructions. Beginning with the Project menu, you can select a new routine or elect to work with an old one. Then go to the Create menu, which allows you to select from a variety of predefined shapes or to choose a tool for free-hand drawing. The menu of shapes and tools is not as extensive as that in Images, so a bit more work will be required if you are working with complex shapes. An alternative is to create your complex shape in Images, save it as a Window (remember the Frame) and move it to Animator. As a Window, it can be moved about the screen and it can be embellished with routines created in Animator.

The next menu is Move, but you can't go there yet, even assuming you've already drawn a shape on the screen. No, you must now go way over to the right of the screen to the Time menu and select "tweener." A "tween" is a segment of animation and you click on it between segments as a means of keeping everything from happening at once.

Let's say that you've drawn a star and the next step is to move it sideways to the right. Without using tween, the star would simply form itself to the right and there would be no animation. Although at times there may be reasons for simultaneous action, such as having the star appear while rotating on its x-axis, a little forethought is necessary in order to make your film turn out the way you hoped it would.

Three-dimensional rotation, of course, is the highest standard of computer animation and the most "Gee-whiz" feature of CAD systems. Not only is it possible with Animator, it is also easy. From the Move menu, you may select to Rotate In-plane, around x-axis or around y-axis or, if you don't use tween, around all three simultaneously.

Exploring other options on the menus, we find we can clone a shape, change colors, re-size objects, create a path for a moving object to follow, outline or fill a shape, change a shape, destroy an object and more. And because we are working with animated rather than static objects, these are all continuous actions.

Your star might start out in center screen as a filled shape, then move sideways and change color; follow a path up the screen and change size; become an outline; change to a polygon; be destroyed; be reborn as a square rotating on its y-axis; recede into the background; change color; rush to the foreground - the routine you can create is limited only by the memory in your machine and we'd expect most people, especially those

continued on page 150

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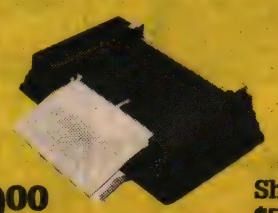
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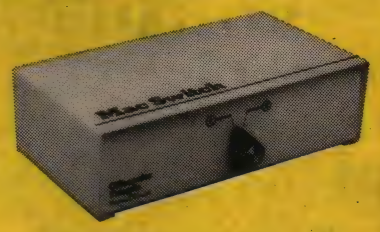
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Aegis Images
continued from page 149

using Animator for business presentations, to quickly opt for the memory expansions that are measured in megabytes.

Imagine a bar chart, the chart itself created in Images, then moved to Animator as a background. As you replay it for your supervisor, colored bars appear from stage right and stage left, position themselves on the chart, then grow right before your eyes.

Or perhaps an exploding pie chart. The pieces of the divided pie move apart; the piece representing your market share assumes center stage while the others tumble into the background; your piece comes toward the foreground, growing to fill the screen, then becomes an outline that frames your company name or logo.

It is all possible with Animator and some dedicated work.

As you select each option from the menu, a one-line message bar will change to show what that option will do for you. In addition, as you become more adept and more accustomed to the routines indicated by different cursor shapes, you may go to the "quick-select" option, which presents you with an on-screen palette representing every command of which Animator is capable, much as does the Fast Menu in Images.

When your routine is done, return to the Time menu and select Replay All. Now your creation will run in the proper sequence and, if you really like what you've done, you can select Replay Loop and allow your routine to continually repeat itself while you go drag all your friends and neighbors into the house to show them - or while customers at a trade show are caught by the continous-running display at your booth.

Stars and polygons are not the only shapes you can work with, of course. You have free-hand drawing and you can use the pre-defined shapes as building blocks to make people, spaceships, moving bar charts - almost anything you can imagine.

Whatever routines you create can be saved to disk and a storyboard option allows you to set up an order in which related routines will be recalled from disk in order to make longer routines possible. We also see this as a terrific tool to be used with a VCR and the composite output of the Amiga, as a means not only of building longer routines on videotape but also of being able to replay them in schools or offices that may not yet have an Amiga computer.

In fact, Animator can be used in an opposite fashion with a VCR. As soon as Commodore releases the GenLock interface, you'll be able to grab and freeze a frame from videotape, videodisk or direct from your video camera. Thus loaded into Animator, you can then embellish the backdrop with whatever animation you can imagine.

Besides video sources, you can load in paintings created with any such program that saves material in the IFF format, a growing standard developed by Electronic Arts - including those created with DeluxePaint from EA.

In summing up, we would have to say that Aegis Animator is all we hoped it would be, and more. Very few of us will ever have the opportunity or the expertise to operate a CAD system and while animator makes no pretense of being one, the final results on the screen can be very close. It is easy to use and it can be deeply explored after only a swift scanning of a few pages. This should not be taken as an invitation to throw away the manual and bull your way through, however. Read it all, refer to it often and you can be turning out animations as good as those seen on the nightly network news.

The price, in a package that includes Images and Animator along with extensive and easy-to-understand instructions on each, is $139.95 - in our book, a bargain price for one of the best and most complete creative tools available for the Amiga. •

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CBS Interactive Learning, the exclusive marketer of the Microcomputer Workshops Courseware and CBS Software product lines, has announced a computer hardware/software sweepstakes co-sponsored by Apple Computers, Inc. and Juki Office Machine Corporation. The sweepstakes is open to all faculty members and administrators at elementary and secondary schools. Prizes include:

* **Two First Prizes:** Apple IIe computers with DuoDisk Drives and Apple IIe Color Computer Monitors.
* **Four Second Prizes:** Juki 5520 Color Printers.
* **100 Third Prizes:** Winner's choice of any one software package from CBS Interactive Learning.

All First and Second Prizes will be donated in the winner's name to his or her school. Educators may enter the sweepstakes as often as they wish by sending their name, name of school, position held, school address and telephone number to: CBS Interactive Learning Sweepstakes, One Fawcett Place, Greenwich, CT 06836.

All entries must be postmarked no later than June 30, 1986. Winners will be notified and prizes will be mailed out by September 30, 1986. For further information, call 1-800-CBS-ASK-4. No purchase is required to enter the sweepstakes.

Mention that you read about it in *Computer Shopper*. ●

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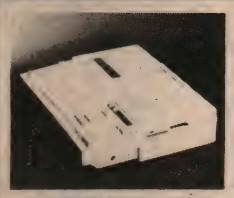
continued from page 67

DOS 3.3, one supports ProDOS, and the other two sides support various versions of CP/M. At the present, CP/M is supported for the original Microsoft Softcard, ALS Z-engine, and PCPI Applicard. Other CP/M, and possibly even MS DOS formats are expected to be supported in the near future. The utility diskette will load in a driver routine which attaches the proper software drivers to your operating system. In CP/M the program modifies your BIOS (Basic Input/Output System) to indicate that two high-density drives (C: and D:) have been added to your system. If you want to run your EquiDisk+ in the Televideo format all you have to do is run an extra program QX.COM, and then your EquiDisk+ will "think" that it is a Televideo drive. The ProDOS patch just sets up the ROM area of the controller card to indicate that the EquiDisk+ is a mass storage device. The EquiDisk+ is totally compatible with ProDOS, and does not modify ProDOS in any way. The DOS 3.3 patch puts a patch into DOS's RWTS routines. It requires a copyable (or at least modifiable) standard version of DOS 3.3. At the present time the EquiDisk+ is not compatible with any version of Apple Pascal.

The RAM based drivers make the EquiDisk+ more versatile, and expandable, but do cause a minor problem. At the present it is not possible to boot the EquiDisk+ directly. You must first boot the floppy diskette with the operating system and drivers you want

continued on page 157

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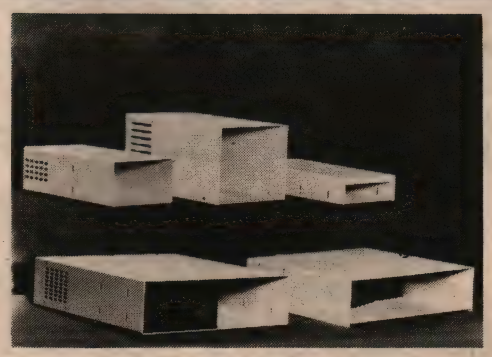
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Eight Schools Join Apple University Consortium

Apple Computer recently announced the expansion of the Apple University Consortium (AUC) to include eight U.S. universities. Joining the AUC are Massachusetts Institute of Technology, University of California at Berkeley, University of Illinois at Champaign-Urbana, University of Maryland, Drake University, Duke University, Emory University, and Franklin and Marshall College.

The AUC, established in January 1984 in conjunction with the introduction of the Macintosh computer, brought together 24 leading universities to explore innovative uses for the Macintosh personal computer, develop courseware, share information with each other, and act as an advisory council to Apple.

"The advice we've received and the development efforts that have been achieved from this program have proven to be extremely valuable. We now feel it's time to expand the AUC and include a broader base of universities that reflect Apple's increasing interest and involvement with Unix, supercomputers, networking, and computer intensive campuses," said Bud Colligan, Apple's manager of higher education marketing. "Our goal is to keep the consortium small enough to maintain a high quality exchange of information yet broad enough for everyone involved to benefit from the expertise each brings to the program."

Each university has made a $2 million purchase commitment over the next three years, as well as commitments to develop software and integrate Macintosh into the curriculum and into their data communications and networking plans.

Apple provides members with the opportunity to offer advice to Apple on the product needs of universities as well as with a forum for sharing ideas and developments. So far university developers have produced more than 300 software applications that will soon be available to schools and students through the Academic Courseware Exchange, a software distribution program run by Kinko's Graphics of Santa Barbara, California.

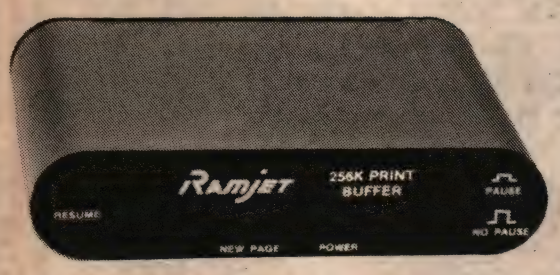
Since its inception, the AUC program has put thousands of Macintosh computers into the hands of students on member campuses and spawned an interest that has led to sales to hundreds of campuses throughout the United States.

In addition to its use as a general productivity tool spanning all disciplines, the Macintosh is used on campus for such academic pursuits as simulating chemistry and physics experiments, teaching Pascal programming and creative writing, designing buildings, creating foreign language fonts and analyzing investment alternatives. Macintosh also acts as a desktop communications window for accessing and using information from campus minicomputers, mainframes, and supercomputers. With Apple's LaserWriter printer, colleges and universities are using Macintosh technolgy to produce dissertations, student newspapers, faculty newsletters, and annual reports.

Other members of the consortium are Boston College, Brigham Young University, Brown University, Carnegie-Mellon University, City University of New York, Columbia University, Cornell University, Dartmouth College, Drexel University, Harvard University, Northwestern University, Princeton University, Reed College, Rice University, Stanford University, University of Chicago, University of Michigan, University of Notre Dame, University of Pennsylvania, University of Rochester, University of Texas at Austin, University of Utah, University of Washington, and Yale University.

For additional information contact Apple Computer Inc., 20525 Mariani Avenue, Cupertino, CA 95014; (408) 996-1010.

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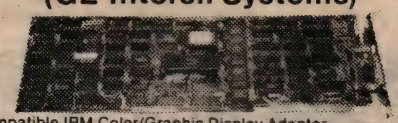
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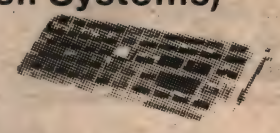
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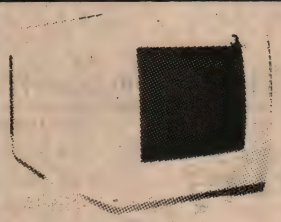
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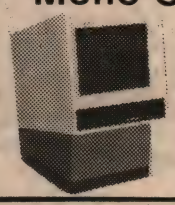
$80 Ea. Amber
Ea. Green
Shipping & Handling $25.00

14" RGB Color Monitor W/Colorgraphics Board

25 MHZ Band Width
Tilt Swivel Base
IBM* Compatible

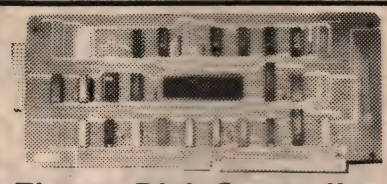
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Composite Video
110V (Used Good)

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Controls 1 to 4 Drives, Single or Double Sided
MODEL FE5140

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Dual Drive Cable Harness Kit
Includes new power cable, data cable, 2 "Y" power cables

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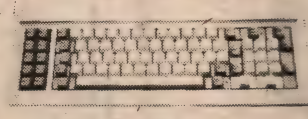
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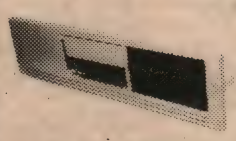
$69 ea.
Shipping & Insurance $6.50 ea.

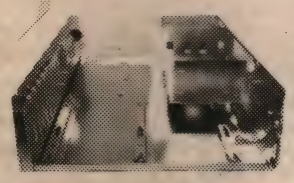
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Transfer Rate: 806 KByte/Sec.	Transfer Rate: 596.6 KByte/Sec.
Average Seek 45 MSec	Average Seek: 70 MSec.
Max Seek: 85 MSec	SHUGART OEM
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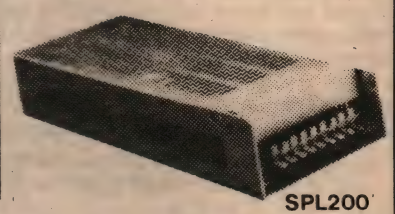
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8799	+5.0V 5% To1 1.0A to 3.0A	+12.0V 10% To1 1.0A to 3.0A	-12.0V 10% To1 0.1A to 0.3A		$25.00
5230	+5.0V 5% To1 4.5A to 18.0A	+12.0V 5% To1 0.1A to 2.5A	-12.0V 5% To1 0.0AA to 0.25A		$35.00
9246	+5.0V 5% To1 3.0A to 7.0A	+12.0V 5% To1 0.75A to 3.0A	-5.0V 10% To1 0.0A to 0.3A	-12.0V 10% To1 0.0A to 0.25 A	$25.00
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Ask The Guru
continued from page 67

a new line of "(space)Y?" after each disk access.

These five are the major differences, but there are probably a few more as well. The ultimate way to translate a WPL program is to rewrite the entire program out in very simple declarative English sentences. Then do each sentence *by hand,* watching the prompts and the results of each command. Then modify your sentences so they work under ProDOS Applewriter. Finally, rewrite the original program to pick up the changes.

Show Me A WPL Keyword Indexer

Keyword indexing is useful whenever you want to generate an index for a book chapter, or any other time you want to save a list of certain key words or phrases in a textfile.

I finally got around to translating my keyword indexer for DOS 3.3e over to ProDOS. All that really needed done was a change to "!" disk searching delimiters, and some answer lines needed insertion for the "Destroy Old?" prompts.

Figure 1 on page 156 reveals all.

What you do is carefully chose a "phrase start" marker and a "phrase end" marker that will only appear on the screen. This means the markers must not change the length of any line computations, and that they must not be either recognized or used by the printer or printer card.

For many printers, a good starting marker is an "[esc]\" form separator, while an "[esc]]" group separator makes a good ending marker. These are ignored by most printers, but be sure to check yours. Further, since they are an escape command followed by a single character, the *stretchifier* patch in my *ProDOS Applewriter Toolkit* will automatically ignore them in justification line counts.

To use the keyword indexer, mark the start of each word or phase you want to keep with the starting marker, and the end with the ending marker. You can mark multiple words, but the length limit on any single phrase is 64 characters. These markers remain in your textfile and will appear on screen only.

Then you run the WPL. KEYWD.INDEX routine. This will automatically scan your textfile and create a list of all the keywords. You have the option of starting a new list or appending an older one.

Note that this is a middleweight routine that will put the words into a list for you, but does not search for duplicates or put the results in alphabetical order. You can easily extend the routine for fancier features.

A gotcha or two on the listing. Where you see a [L], this means to insert a control-

continued on page 156

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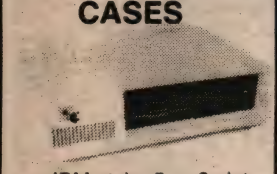
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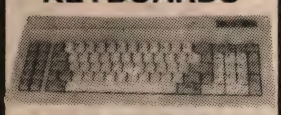
SPECIAL BONUS Norton Utilities *Ver 3.1* Reg. $99, **only $70** w/purchase of any disk drive. IBM PC-DOS 3.1 (the real thing) Reg $85, **only $60** w/purchase of motherboard.

CASES



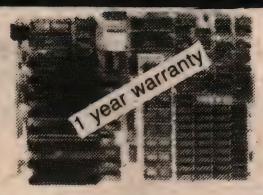
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Fig. 2 - A typical convention badge.

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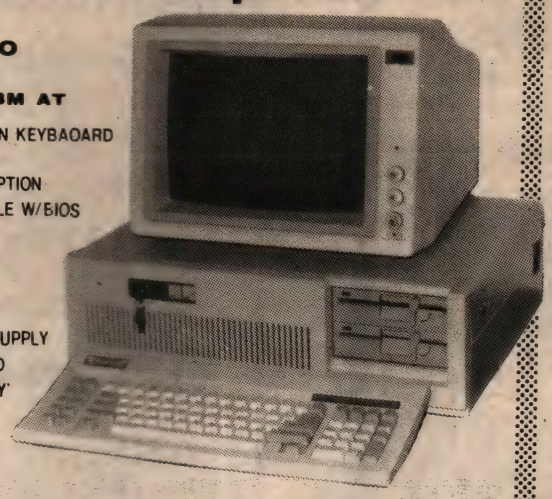
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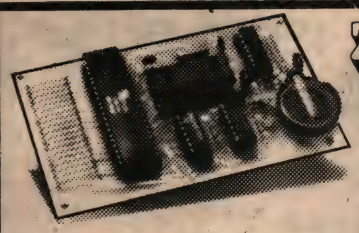
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Ask The Guru
continued from page 154

L into the WPL program. Where you see the phrase marker definitions, you insert an escape and a "control-backslash" for [esc][\], and an escape and a "control-closing bracket" for [esc][]].

```
pnd
ppr [L]
ppr
pin  Name of textfile to be scanned ------> =$A
ppr
pin  Name of file to save key words -------> =$B
ppr
pin  New (N) or Append (A) index file --> =$C
ppr
ppr [L]
ppr  Place your work disk into drive #2.
ppr
pin    Press any key when ready --->
ppr [L]
oh,d2
p
p
ppr         *** busy - please wait ***
ny
l$A
pcs/A/$C/
pgo ap
pcs/a/$C/
pgo ap
pas =$C
pgo nw
ap pas+=$C
nw pas [esc] [\] =$A
 pas [esc] [] =$D
 b
a f!$A!
 [esc]
 pgo b
 pgo c
b u
 u
 s$B!$D!$C
 y
 p
 p
 pas+=$C
 pgoa
c ny
 l$B
 p
 p
 b
 f<$D<><a
 p
 p
 s$B
 y
 p
 p
 pqt
```

Fig. 1 - A ProDOS Applewriter WPL indexer.

How Can I Do A HIRES Dump Under Applewriter?

We covered this one a few columns ago, but this is the single most-asked helpline question, so let's try again.

The simplest way to handle graphics under Applewriter is with *post processing*. Post processing will let you do just about anything on just about any printer card, without too much in the way of programming skills being needed.

To post process, first put a key in the text where you want your picture to appear. A "<return>!hd MYGREAT-PIX" might do it for you.

Next, print to disk using the magic of PD8, creating a textfile that has the magic key every place you want a HIRES image.

Next, read the textfile on disk with *Applesoft*, rather than *Applewriter*. Do this by opening the textfile and grabbing a line. If the line does not have the magic key marker in it, print the line as is.

If the line does have the magic key in it, load your HIRES picture or chart, activate your HIRES dumper (the Grappler card is good at this sort of thing), and print your picture to the page. Finally, pick up on the next text line and continue to the end of the document.

The beauty of this method is that it always works, even with very oddball cards, printers, and HIRES dumpers. Only average BASIC programming skills are needed, and no custom machine language programming is necessary.

Post processing by Applesloth may turn out a little on the slow side, but use it anyway to get exactly what you want. You can later speed things up by going to a hard disk, a RAM expansion card, a

continued on page 159

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EquiDisk +
continued from page 151

from your Apple-format floppy drive, and then run your programs off the EquiDisk + . Hopefully a new version of the EquiDisk + software will be released which modifies the boot tracks of an EquiDiskette, and adds the driver routines to the diskette to make auto-boot EquiDiskettes possible.

If you access large libraries of CP/M software on your Apple, then the EquiDisk + is a good investment. Unfortunately CP/M is being used less and less. Kaypro, once one of the largest CP/M manufacturers, has announced that it will no longer produce CP/M systems and will concentrate its efforts on MSDOS units. At a recent Computer Flea Market several CP/M systems went up for auction, and didn't sell. Nobody was interested in purchasing a CP/M system. If the EquiDisk + had come out two years ago, it would have been a much more versatile and viable product.

Byte-for-byte, the EquiDisk + is less expensive than floppy drives, and less expensive than similar "translation" drives for other computers. The Abalton for the Macintosh retails for $695 for a unit which has 64K of RAM and a Z80, but that price only includes a single drive.

Even with the various limitations there are quite a few good applications for the EquiDisk + . For example:

- The most obvious purpose for the EquiDisk + is to transfer CP/M programs or MS-DOS data files back and forth between Apple and other 5¼" CP/M formats. A user with an EquiDisk + , and Apple floppy drive, and a CP/M or MS-DOS system can easily transfer files back and forth with PIP, instead of worrying about modems, and special adapter cables. 95% of CP/M programs are distributed on either Apple CP/M or some MFM 5¼" CP/M format. With a properly equipped Apple and EquiDisk + you can access all of those programs.
- If you use CP/M on your Apple and have another location (office, customer, friend) who use CP/M on other machines, you can prepare files or programs on your system, and swap compatible diskettes as needed. Within hardware limitations (graphics resolution, I/O devices, etc.) a program can be written in Microsoft BASIC or Fortran on your computer, and transfered without modification to the other CP/M system, or receive diskettes intended for use on other CP/M systems.
- Files, although not programs, are even compatible with the MS-DOS format. You can use Wordstar on your Apple, and format and save a diskette with Wordstar files. That diskette can be used with MS-DOS systems, with the proper utilities.
- An EquiDisk + makes an excellent low cost backup device for a hard drive. It takes only twelve floppy diskettes to backup a ten meg drive on the EquiDisk + , as opposed to sixty-five standard Apple floppies.
- In addition, the EquiDisk + makes a good drive for a vertical market application where large amounts of on-line storage is needed. A BBS, or a specialty application (e.g. Appleworks at one location in an office) can be used in a cost effective setup.

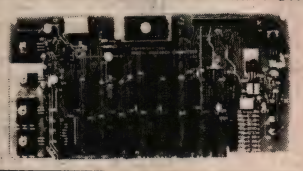
H&M Disk Services has fixed and sold various disk drives for the last several years. The company has sold drives and drive related products made by other manufacturers, but has not designed their own products until now. The company is oriented towards the hobbyist, and industrial computer user who doesn't care about fancy cases or manuals. H&M's primary business has been fixing disk drives and supporting users. This shows in the EquiDisk + 's design. The drives do not come in plastic designer cases. The EquiDisk + case is a rugged steel case, with mounting holes and a heat sink sticking out of the back. The EquiDisk + has its own fuse protected power supply, and includes three convenience outlets and a lighted power switch on the front of the case. It won't earn any awards in a fashion design competition, but it will work well, and will outlast any plastic case.

H&M Disk Drive Services, 1101 E. Pacifico, Anaheim, CA 92805; (714) 385-1146 is offering a special discount for *Computer Shopper* readers from now until August 1, 1986. If you mention this article, H&M will sell you a two drive EquiDisk + system for $579, the normal price of a sihgle drive system; a $100 discount. ●

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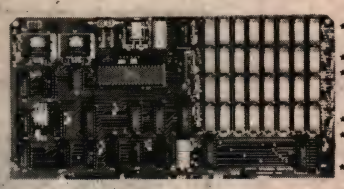
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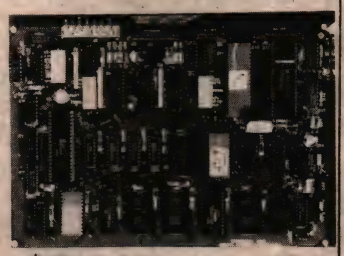
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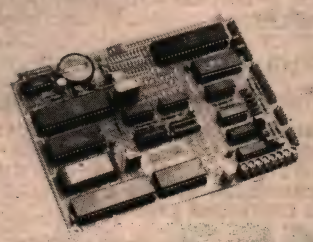
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Apple II ProDos & IBM PC Versions Of Writer's Helper

Conduit, the educational software publisher at the University of Iowa, has announced the release of Apple II ProDOS and IBM PC versions of its best selling software package Writer's Helper by William Wresch of the University of Wisconsin, Stevens Point. The Apple ProDOS and Apple DOS 3.3 version of Writer's Helper are combined into one software package on a floppy diskette.

Writer's Helper, for the Apple IIc, IIe with an 80-column card, and the IBM PC, is a collection of programs designed to help students find and organize ideas, put those ideas in writing, and evaluate what they have written. This program can be used in almost any discipline by students in junior high through graduate school. The Apple version works with word processors that store files as standard ASCII text files and Bank Street Writer. The IBM PC version works with word processors that store files as standard ASCII text files and has been tested with PCWrite, Textra, Volkswriter Deluxe, Word Perfect, and Wordstar.

Registered users of the Apple DOS 3.3 version of Writer's Helper can upgrade to the Apple DOS 3.3/ProDOS version by sending all of their program disks to Conduit by September 1, 1986. There will be no charge for the upgrade.

For further information contact Conduit, University of Iowa, Oakdale Campus, Iowa City, IA 52242; (319) 353-5789.

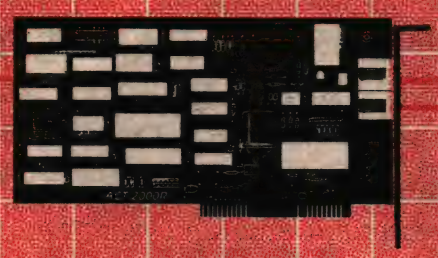
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Toshiba P351
continued from page 68

Now that's a test I never want to repeat!

Unfortunatly, although the Toshiba has excellent hardware, the software is not as powerful. Toshiba printers use their own software instructions which are not compatible with most popular dot matrix printers. Many popular commands including slashed zeros and software disable paper-out are not available. Most text oriented programs have no problems using the P351, but some programs need to be "customized" with special control codes in order to use the enhanced character sets: If your program will work with a Qume 5 or Qume 11, it will work with the Toshiba. The P351's command set is a superset of the Qume control codes. Wordstar, Appleworks, and other word processing programs will all work perfectly. But — although those programs will work fine with the P351, they won't use the extra capabilities of the Toshiba — how many Qumes do you know which can select different character sizes through software? If a program is software configuerable, the enhanced Toshiba features can be used. Figure 3 (page 68) gives the

continued on page 164

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Ask The Guru
continued from page 156

total file load, a custom machine language patch, or whatever else suits your machine and your personal vibes.

What Is This Month's Laserwriter Scam?

Badges. The *Laserwriter* is absolutely ideal for custom badge printing at fairs, shows, conventions, sporting events, wherever. Its ability to quickly and easily set circular text is a big advantage when doing many badge styles.

The automatic step-and-repeat routines in my *Applewriter/Laserwriter Utilities* let you do lots of badges on a single sheet of paper. You can also do such things as automatic sequential numbering, or "real time" insertion of the "badgees" name, even in calligraphy.

By now, you have surely seen those "Badge-a-Minit" kits available from many mail order suppliers. This is basically a hand-held press that will convert a message on a flat sheet of paper into an attractive badge. In quantity, the badges themselves cost around 13 cents each.

You can get away from black and white by using colored paper, such as *Astrobrite* or something similar, by using colored toner, or else by using

continued on page 165

ptsize equals -80
ptsize equals +24
ptsize equals +80

ptsize equals -80
ptsize equals +24
ptsize equals +80

Fig. 4 - Using ptsize can get very tricky.

```
initgraphics

/outsideclover {135 45 [-82 23 -119 62 -154 100 -180
130 -189 150 -170 156 -130 160  -88 176 -29.5 189
29 176 70 160 111 156 130 150 121 130  95 100 60 62
23 23] curvetrace closepath } def

/insideclover {135 45 [-71 35 -106 75 -134 108 -155
134 -155 134 -110 140 -70 155  -29.5 162 11 155  51
140 96 134 96 134 75 108 47 75 8 35] curvetrace
closepath} def

/buttonproc { gsave outsideclover 8 setlinewidth 0
setgray stroke insideclover 5 setlinewidth 0 setgray
stroke grestore } def

0 setlinewidth gsave

/buttonproc1 { gsave 0.475 dup scale 30 40 translate
buttonproc grestore} def gsave 300 300 translate 4
{buttonproc1 90 rotate} repeat grestore

newpath 2 setlinewidth
300 300 65 0 360 arc gsave 1 setgray fill grestore
4 setlinewidth stroke 1 setlinewidth 0 setgray
newpath 0.90 setgray 0.3 setlinewidth

gsave 300 300 translate  7 { 65 0 moveto -65 0 rlineto
13.8 rotate 65 0 rlineto closepath gsave 0 setgray
    stroke grestore 13.8 rotate } repeat grestore

/starpath{ dup 0 exch 2 div rmoveto /starheight exch
0.3635 mul def 18 rotate 0 starheight neg rlineto 72
rotate 5 { 0 starheight neg rlineto 36 rotate 0
starheight rlineto -108 rotate } repeat} def

0 setgray 300 300 65 0 360 arc 4 setlinewidth stroke

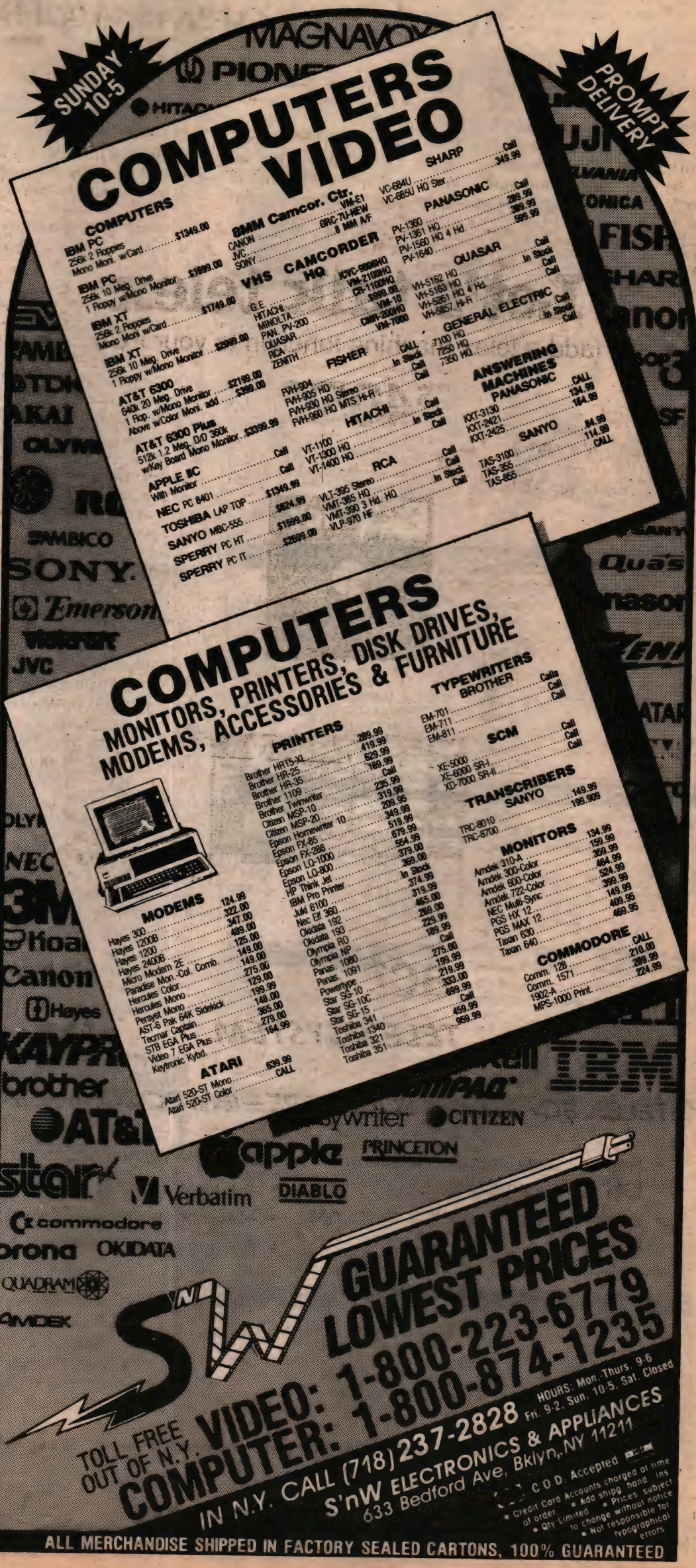
0 setgray gsave 300 300 moveto 50 starpath gsave 1
setgray fill grestore 2 setlinewidth stroke grestore

gsave 300 300 translate 0 setgray

/NewCenturySchlbk-Bold findfont [30 0 0 30 0 0]
makefont setfont (Convention  1986) 55 -90 152
insidecircletext (Safford,  Arizona) -40 90 138
outsidecircletext

/NewCenturySchlbk-Bold findfont [25 0 0 25 0 0]
makefont setfont (AFFA) 53 -90 56 insidecircletext
```

Fig. 3 - A Postscript badge drawing program.



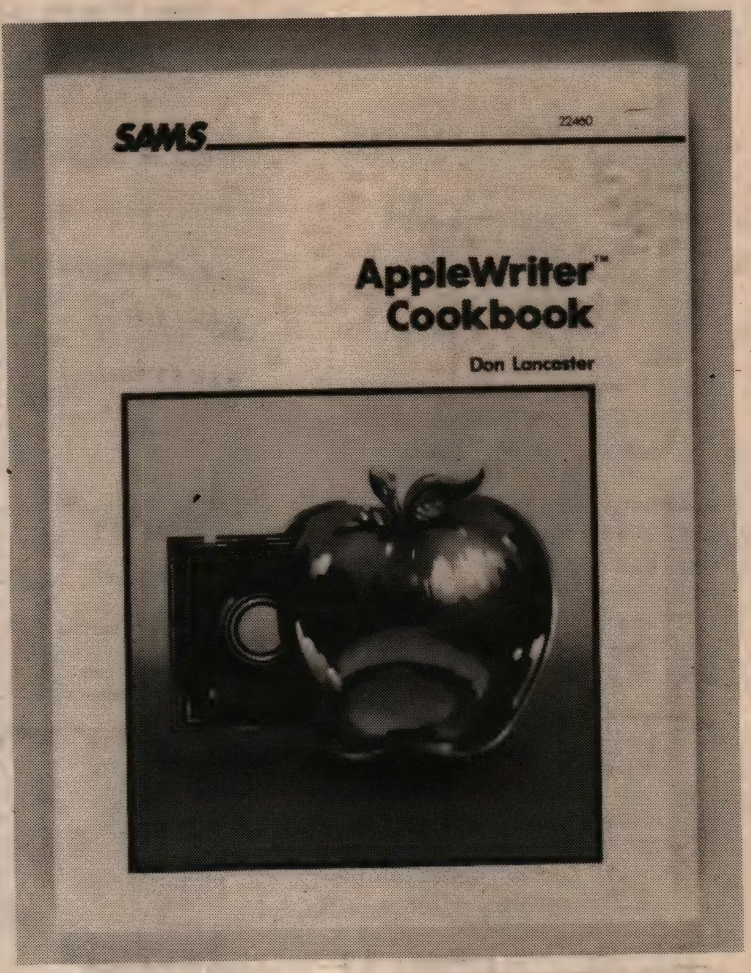
AppleWriter Questions Are Answered By Don Lancaster in *AppleWriter Cookbook*

Howard W. Sams & Co., a Division of Macmillan, Inc., has published in a long, successful series of uniquely styled, uniquely written books by Don Lancaster. *AppleWriter Cookbook* covers a wide range of topics giving thorough and extensive coverage of the five different versions of the AppleWriter program, including the new ProDOS 2.0.

AppleWriter Cookbook's first two chapters respond to the questions of actual AppleWriter users whose calls were received by Mr. Lancaster on an AppleWriter voice helpline. The chapters which follow provide additional information on many areas such as: patches for NULL, shortline, Grappler, and other codes; self-prompting glossaries; microjustification and proportional spacing routines; WPL routines for columns; and source-code capturing instructions.

Like most Lancaster books, *AppleWriter Cookbook* has many, many pages of appendixes full of WPL programs and AppleWriter patches, machine language patches, and internal ProDOS AppleWriter 2.0 program details. *AppleWriter Cookbook*'s 352 pages answer users questions, from the bare-bone beginner through the full source-code capturing, go-for-broke hacker. Retailing for $19.95, the book is a must-have for all AppleWriter users.

Don Lancaster, author of many titles in the Sams "Cookbook" series, heads Synergetics, a prototyping and consulting firm that specializes in microcomputer applications and electronic design. Mr. Lancaster is a prolific author, with several best selling books.



A microcomputer pioneer, he has a unique writing style that blends information with entertainment to hold the reader's attention.

Howard W. Sams & Co. is an Indianapolis-based publisher of more than 400 books covering electronics, computers, engineering, and communications. Beginning in 1946 with electronic service and repair data, Sams rapidly grew to include computer service and repair data, distributor catalogs, technical books and custom publishing services...making Sams one of the largest technical publishers. Sams books are available through bookstores, computer retailers, electronic distributors or directly from Sams by calling (800) 428-SAMS or writing to Sams, 4300 W. 62nd Street, Indianapolis, IN 46268; (317) 298-5409.

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When we found out that we could offer you a complete state-of-the art electronic telephone system for only $1799 we were ecstatic! But we did have a few serious questions. Who is going to install this for our customers? Is it going to be reliable? Who will repair it?

Well the answers were quite exciting. The system is so well engineered you can install it yourself. With the cables we send you, you simply plug it into your RJ11c modular outlets. You connect the telephones to the KSU with the same type of standard plugs. In other words, if you can plug in your present modular phone, you can install your own 510KT or 206KT business phone system. The phone system includes self-diagnostics in the uncommon event that the system needs repair. And repairs are a simple matter of board swapping. You may even want to do it yourself.

Features are easily programmed by a single key telephone set. You don't have to be a computer wizard. The user gets sensible, easy to use features and has the flexibility to change the data-base station, and to change restrictions without rewiring or calling for service.

When you consider the people behind the system, you'll be even more interested in the **510 KT**. The researchers and engineers combine over fifty years experience in the telecommunications industry from the most respected labs in North America: Bell Lab, Bell Canada, Northern Telecom and CDC. The manufacturer build PABX and PCM systems, and other high-tech products. Perhaps best known among them is the monitor for the IBM PC (for which they earned IBM's Zero Defect Award). The **510 KT** is backed by a one year warranty on all equipment manufacturer defects. Emergency replacements are provided, but there's not much chance you'll ever need one.

MW 510 KT was designed for small businesses. There's not another telephone system on the market that can do as much, as simply for less money. There are more complex systems, but chances are they have more gadgets than a small business would ever use, and they're a lot more expensive. There are less expensive and more limited systems that will cost more in the long run with repairs, installation charges and expansion. The **510 KT** is quickly installed, and it has the flexibility to make changes that would require service calls with other systems. The modular system is easy to expand, so it can grow with small businesses. Look into the **510 KT**, it answers the call of small business.

FEATURES

SYSTEM
- –system diagnostic indicator
- –data base change by a single key set
- –flexible extension number assignment
- –power failure backup
- –power failure transfer
- –volume control

CENTRAL OFFICE CALLING
- –multiline pick up
- –private line
- –last number redial
- –abbreviated dialing
- –toll restriction
- –night service
- –switch-hook flash
- –music on hold
- –on hook dialing

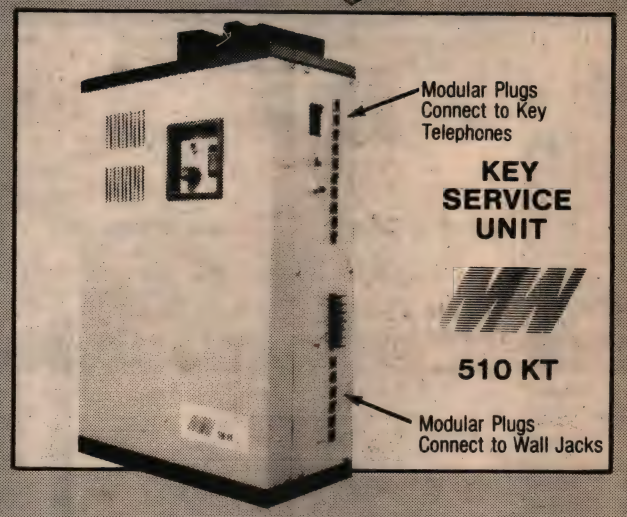
INTERCOM CALLING
- –call forward
- –call pickup
- –call waiting
- –audible signal indicating called party busy
- –station paging
- –talkback to paging station
- –two intercom links

CENTRAL OFFICE AND INTERCOM CALLING
- –line status indication
- –distinctive ringing
- –hold
- –exclusive hold
- –i-hold
- –hold recall
- –privacy
- –monitoring
- –do not disturb
- –three-way conferencing

OPTIONAL FEATURES
- –zone paging via external speakers
- –speaker phone
- –hand free talk back
- – (SMDR) time/date/# called/duration recording (optional)
- –call message display
- –time of day display
- –stop watch for call time
- –directory of abbreviated dialing number display
- –feature operation display
- –dialed number display
- –canned message content display
- –adjunctor converting POT set into 510 KT compatible set

SPECIFICATIONS
- Central Office line capacity: 5
- Intercom link: 2
- Key sets capacity: 10
- Input power: AC 110V 50/60 H_z
- Power consumption: 40 watt
- Cable: 6-wire, Star Connection
- Dimension & Wt: 17" x 12.5" x 5.5" 22 lbs
- Operating temp: 32-104 degrees F





MidWest 206 KT

ONLY $799

Includes:
- Key Service Unit
- 3 Full-Featured Key Telephones

MW 206 KT

The **MW 206 KT** system is a two-line, six extension telephone system which uses the same keyset as MW 510 KT; therefore, the features outlined in the attached literature are identical in both systems. The only difference between the two systems is their capacity (and KSU). this is a very attractive benefit to small, growing companies who do not need a larger system now but expect to expand in the near future. When the time comes to expand to the 510, all that is required is a KSU change. Much less expensive than purchasing a completely new system!

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SYSTEM
- System diagnostic indicator
- Data base change by a single key set
- Flexible extension number assignment
- Power Failure memory backup
- Power failure transfer
- Volume control

INTERCOM CALLING
- Call forward
- Call pickup
- Call waiting
- Audible signal indicating called party busy
- ICM tone plant
- Station paging
- ICM HF talk back

CENTRAL OFFICE & INTERCOM CALLING
- Line status indicating
- Distinctive ringing
- Hold
- Exclusive hold
- I-hold
- Hold recall
- Privacy
- Monitoring
- Do not disturb
- Three-way conferencing

SPECIFICATIONS
- Central office line capacity: 2
- Intercom link: 1
- Key sets capacity: 6
- Input power: AC115V 50/60 Hz
- Power consumption: 25 watt
- Cable: 6-wire, Star Connection
- Dimensions & Weight: 387 x 292 x 132 (mm^3), 5.6 kgs
- Operating temp: 32-104 degrees F

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• MINISCRIBE 6085	75meg	28ms	*$1495*

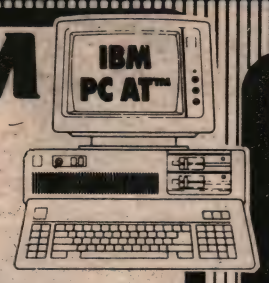
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286

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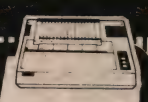
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Manzanita Releases Business Works on 5¼ Disks

Manzanita Software Systems announced recently the release of their product BusinessWorks on 5 ¼" disks for use in installing on a hard disk drive.

BusinessWorks was originally released September 17, 1985 in 3 ½" disk format only, designed for use on Apple's UniDisk 3.5 drives. "While the sales of BusinessWorks have grown steadily since we introduced the product," said Nancy A. Bourne, Director of Marketing, "there was a great demand from existing Apple users for a 5 ¼" version. We decided to meet his demand, so now BusinessWorks can be installed on a ProDOS compatible hard disk equipped with one 5 ¼" disk drive."

Manzanita is now shipping all BusinessWorks products with both 3 ½" and 5 ¼" disks enclosed. The 3 ½" version can be used with two UniDisk 3.5 drives, one UniDisk 3.5 drive and a RAM card, or it can be installed on a hard disk.

BusinessWorks is a full-featured accounting system for the Apple IIe and IIc.

For additional information contact Manzanita, One SierraGate Plaza, Suite 200-A, Roseville, CA 95678; (916) 781-3880.

Mention that you read about it in *Computer Shopper*. ●

Toshiba P351
continued from page 158

software codes used with Applework's custom printer setup menu.

Graphics are even more of a problem. About 30% of all graphics programs have the Toshiba printers available as an option, including Lotus 1-2-3, Printographer, and various other graphics utilities. Unfortunately many programs will only support one particular printer (e.g. Mousepaint only supports the Apple Imagewriter), or some printers and ignore the rest. Print Shop, most smart graphics printer interface cards, and the default MS-DOS (IBM PC DOS) graphics driver (the CTRL-PRINT SCREEN command) just won't work with the Toshiba. On the Macintosh a driver program "Toshstart" replaces the Imagewriter file in the FINDER folder, and makes the Macintosh think that the Toshiba is an Imagewriter for most programs. Even if a graphics program supports the Toshiba, it may not use the Toshiba to its fullest capabilities. Most dot matrix printers cannot print more than 90 dots per inch, and

continued on page 165

New: TOTALOCK! SAVE $30.00

New hardware/software lock prevents unauthorized access without password to your computer, your programs, your financial records, your personal letters, your design secrets, your monitor, modem, printer — even your DOS!

Computer security: it's always been important, and today — with so much crucial data in companies' and individuals' computer files — security is a more urgent concern than ever.

Sure, there are password programs and file-hide utilities around, but they don't stop a clever "trespasser" who's determined to break into your computer.

New TOTALOCK from Netronics stops trespassers dead!

Unlike other "security" systems, TOTALOCK consists of both a special software program *and* unique hardware. They're simple to install: add the TOTALOCK driver program to a "config.sys" file in your computer's DOS operating system, and slip the TOTALOCK hardware halfcard into a half or full slot of your PC, XT or AT (*or compatible*), where it's easily secured in place with a tamperproof, screw.

Three "strikes" and any intruder is OUT!

When you boot up a TOTALOCK-protected computer, your first keystrokes must be the password you've previously selected and installed — up to 19 letters, numbers, characters, etc. You can quickly and easily change the password any time; for extra security, hide the DOS file with our HIDE/ UNHIDE utility, included. (Note: So that others can't see and record your password, TOTALOCK doesn't display it on the monitor.)

Entered it incorrectly? Not to worry: you have two more chances to get it right. But should a trespasser try to break in, and guess wrong at the password three times, the system locks up! Using an ordinary DOS won't help them — the system will instantly lock up again. How about the trespasser booting up with a DOS that includes their own copy of TOTALOCK? Uh-uh: your TOTALOCK hardware won't accept any DOS but *yours*! And just in case they consider switching the hardware, we make it in 8,000 different combinations to frustrate them *again*!

TOTALOCK stops the theft of valuable ideas and delicate information

TOTALOCK protects the kinds of information that is so important *and* so vulnerable to access by snoopers in most computers' files — information like this:

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Stops attempts to change data!
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TOTALOCK not only denies access to your files and programs, it blocks unauthorized use of your entire computer system!

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Stops use of your keyboard.
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Stops use of your telex.
Stops use of your network.

TOTALOCK stops trespassers dead in their tracks!

TOTALOCK belongs wherever protection of data and computers is vital!

You know who you are — but let's just remind you of the types of sites where data protection is virtually — or literally! — a matter of survival:

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Netronics Research & Development has served the needs of computer users since 1974 with dependable products backed by a strong warranty and good service. Our customers include universities, giant corporations, government agencies and thousands of small businesses and individuals around the world.

TOTALOCK comes with a 90-day warranty of performance: if it doesn't perform as claimed, return it for no-questions refund or replacement; it's that simple. We want your peace of mind to be as secure as your computer! (Note: Your TOTALOCK software is not copy protected, but it can only be used with your own TOTALOCK hardware for total security.)

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Send ~~$79.95~~ today for your TOTALOCK, install it, add your private password, then relax in the knowledge that your vital data, your important secrets and your expensive computer hardware system are all absolutely, positively, totally protected!

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Ask The Guru
continued from page 159

dense and attractive grays.

Figure two (page 154) shows a badge we did for a local convention. You can use it to get an idea of what can be done.

Figure three (page 159) shows much of the *Postscript* used for this badge. Also needed are the *sidecircletext* and the *outsidecircletext* routines from *Adobe* and my *curvetrace* routine. I'll be happy to send you a free copy of the latter on request.

Most badges will use a far simpler and far shorter routine. This one is long because of the fancy quad curvetrace for the background, and the detail in the star and the sunburst.

Once you get a library of stock shapes and formats built up, it only takes two or three minutes to create the badge from a cold start. Should you be making repeat badges, the per-badge time will be much less.

Any Secrets Involved In Setting Circular Text?

One or two. First, be sure you have on hand copies of the *Postscript Reference Manual*, and the *Postscript Tutorial and Cookbook*. These are written by Adobe and published by *Addison-Weseley*.

Second, there is a *ptsize* command that is included in Adobe's *insidecircletext* and *outsidecircletext* routines that can cause all sorts of confusion if you do not understand what it is and what it does.

The actual horizontal and vertical point size of your circular text is set by the font definition you create ahead of time. Thus, 21 point type will always appear on the circle as 21 point type.

What *ptsize* does is set the *spacing* of the chosen sized characters around the circle. Figure 4 (page 159) shows you details.

The tricky part is as follows: On the *insidecircletext* routine that would go on the bottom of the badge, the *ptsize* command works exactly as you would expect it to. The bigger *ptsize*, the further apart the letters. A good starting point is to use a *ptsize* somewhat larger than your actual point size.

The puzzlement comes when you try to use *ptsize* on the *outsidecircletext* you would use at the top of a badge. The larger *ptsize* gets, the closer together the numbers get. And a zero *ptsize* only slightly spreads the letters.

What to do?

Use *negative* values for *ptsize* on the top of the badge. The more negative the number, the wider apart the characters on the top of the badge.

Summing up: the font definition decides how high the letters will be. On the bottom of the circle, a bigger *ptsize* will spread the letters. On the top of the circle, a bigger but negative *ptsize* will spread the letters for you.

Once you have preloaded these routines, you can type circular text just as quickly and easily as you would type a plain old line of characters.

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Toshiba P351
continued from page 164

many graphics programs are optimized for about the same resolution. If they work with the Toshiba at all, they may only print images with a 90 dot per inch resolution. With a properly written program, the Toshiba will print a circle which looks like a circle. With other programs, the output will look the same as the output from another printer, with coarse resolution and jagged edges. If your program is a screen dump program this won't make much of a difference, but if your program produces graphics beyond the limits of your screen (e.g. most graphics packages which produce pie charts, graphs, and fine illustrations) then this is something you should be concerned about.

The Toshiba comes with a very good, liberally illustrated 150 page manual -- but the manual is oriented towards end users. There is very little programming information, or documentation on how to use the graphics or downloadable fonts feature. A technical reference manual is available separately. I highly recommend it for any serious user.

Three different models of the "3 in one" printer are available. The P351 replaces the older 1350 and 1351 models. It has a 15" carriage, the downloadable fonts, and optional font cartridges in ROM. It prints at up to 288 CPS in the draft quality mode, and 100 CPS in the NLQ mode. The P341 model is a slower (216/72 CPS) version, and does not have the downloadable fonts built in.

The P321 model has a 8" carriage, and has all of the features of the P351 except the special font capabilities. It prints at the same speed as the slower P341 printer. The printer comes as a friction feed unit with the automatic sheet loader, with tractors and sheet feeders available as options.

Would I recommend the Toshiba printers? You bet! The P321 model costs no more than normal dot matrix printers, and the P351 model has the power to even challenge a laserwriter. The letter quality of the Toshiba is good enough for a lawyer, the draft quality speed is fast enough for heavy duty accounting work. If you have a Toshiba there is one thing you must be very careful to do. Whenever you purchase any software program, make sure that it supports Toshiba printers, or can be configured. A color version of the P351 is under development, and should be available some time this year. ●

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Spotlight
continued from page 90

from the service and the percentage of total practice income each service accounts for. This information can help to keep fees in proportion to the effort expended and ensure the proper use of the staff. Billing—provides an interface to the cash control and service transaction for those accounts which do not pay for service during the office visit. Invoices are balance forward with a complete record of the transactions for the current billing period. Accounts Receivable—reports include: account aging and a delinquency report to help track down overdue and unpaid accounts. Price listed does not include the Billing function. A version with Billing is available for $1985.00. Approximate storage requirements: Programs 3MB, Patient records 1.2K/Patient, Inventory 4K/100 line items. ●

Spotlight on Medical Resources will be continued in July Issue.

Using Call Key
continued from page 85

without fumbling with the shift-key or depressing the ALPHA-LOCK. Beware, though, that if the program is retrieving a disk file that is named with lower-case, the disk controller will not find it if the name is entered this way.

Mode 4 has fewer applications on an elementary level. All ASCII codes in 7-bit format are enabled (0-127), unlike modes 3 and 5, where 16-31 are disabled. As when switching to mode 3, switching to mode 4 affects the INPUT and ACCEPT statements. Typing in mode 4 will allow data in files to be generated that couldn't be generated in modes 3 or 5 (i.e. with control characters in them that were entered via the keyboard. If the values are entered through the program with the CHR$ function, no difference will appear). One note of caution: ENTER and CTRL-M both return the same character code in mode 4 (which makes code 141, normally returned by CTRL-M, unavailable). If this is undesirable, you'll have to program around it. I don't know of any TI software that uses this mode, since it is incompatible with the 99/4. Other codes are also generated.

Mode 4 has some other side-effects that may have some application, although I haven't found many yet. One is that in both TI BASIC and TI Extended BASIC the CLEAR key (FCTN 4) will not stop a program on an INPUT or ACCEPT statement. Try this:

```
100 CALL KEY(4,K,S)
110 INPUT "TRY IT":A$
120 GOTO 110
```

Can't break the program? Hmmm...Gee, how do you break such a program? Don't turn your 99/4A off. Just let the program sit. The answer comes indirectly from the *User's Reference Guide*. It tells us the code for CLEAR in mode 5 (normal BASIC mode) is 2. In mode 4 (Pascal) a 2 code must be produced by some key, so which one? Well, looking to the appendix in the *User's Reference Guide*, we see that a CTRL-B will give you a 2 code. Now RUN the above program again. Have you noticed some other unique things...ERASE (FCTN-3) doesn't work either...and neither do DELETE and INSERT (FCTN-1 and -2). Look up the codes for those keys in the *User's Reference Guide*. Try them in the INPUT lines. Neat huh? Try FCTN-S. So, you can't backspace either! Now if any of you are familiar with any other computer systems, mainframes or telecommunications, then you might be able to guess what keystroke will result in a backspace like FCTN-S will: CTRL-H. Try this one too. Try some others and tell the rest of us if you find out something interesting!

If you intend on using mode 4 in conjunction with files on the Disk Memory System or the RS232, remember to push the ALPHA-LOCK down. Otherwise the lower-case might give you a headache.

Mode 5 is the normal BASIC mode, which most people should be familiar with. If not, it was discussed in depth in *Compute!* of November 1983. There are some differences between TI BASIC and TI Extended BASIC as far as applications of mode 5. TI BASIC allows graphic definitions up to ASCII 159, while TI Extended BASIC only allows definitions up to ASCII 143 (16 fewer; the memory issued to keep track of sprites). When PRINTing graphics to the screen instead of the slower CALL HCHAR or CALL VCHAR, no codes past CTRL-0 should be used for TI Extended BASIC. Codes up

continued on page 168

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Using Call Key
continued from page 166

through CTRL-9 may be used in TI BASIC.

Usually, when CALL KEY is used for routine-jumping, two methods are employed. The first method uses a series of IF-THEN statements to check each condition individually. This procedure is, well, slow. IF-THEN allows the 99/4A to make as few as one scan per second. Depending on how it was coded of course. The second method normally used is a CALL KEY ON exp GOTO where the command keys are consecutive, as in A-G or 1-9. This method is quite fast, but a programmer must use consecutive keys, which makes the mnemonic (memory-aiding) value of such keys poor.

But really, just two statements can handle all the branching from the key-scan to subroutines. How can just two lines do that? The secret is in the two statements, often used separately, but rarely together: POS and ON exp GOTO (or GOSUB). The POS function searches a string for the value returned by CALL KEY, and the ON exp GOTO performs a calculated jump, i.e. a jump determined by the value of exp. The string should be defined early in the program (once only to avoid wasting time) using string literals and/or the CHR$ function. The actual characters contained in the string are one greater (ASCII code) than the value required. For example, the "TE" in the string below represents "S" and "D".

```
100 STRING$=CHR$(0)&"TE"
110 CALL KEY(3,K,S)
120 ON POS(STRING$,CHR$(K+1),1)+1 GOTO [illegal or
unused key routine], [no key routine], ["S"-routine],
["D"-routine]
```

The full code is presented here:

```
100 CALL KEY(3,K,S)
110 STRING$=CHR$(0)&"TE"
120 CALL KEY(0,K,S)
130 ON POS(STRING$,CHR$(K+1),1)+1 GOTO 140,160,180,200
140 PRINT "ILLEGAL KEY"
150 GOTO 120
160 PRINT "NO KEY"
170 GOTO 120
180 PRINT "S KEY"
190 GOTO 120
200 PRINT "D KEY"
210 GOTO 120
```

When you run this program, leave the ALPHA-LOCK off. You'll see why shortly. The character STRING$ will represent the key-codes retrieved by the KEY subprogram. One (1) must be added to this expression because the KEY statement returns negative one (-1) when no key is pressed, which cannot be used as an argument for the CHR$ function. The argument for CHR$ [K+1] then becomes zero when no key is pressed, and zero is in the first position of STRING+ (check the definition in line 110). This makes the routine loop back if no key is pressed to scan the keyboard again. If an illegal (unused) key is pressed the POS function will return a zero, meaning that a match was not found of the strings. Therefore, one (1) must be added to the expression because the ON exp GOTO cannot use zero as an argument. The line, therefore, becomes as is shown in line 120 above. To add more routines to a program, all that is necessary (beyond the routine's code) is to add another line number to the list in the ON exp GOTO and an appropriate character to the string.

The keyboard can be scanned up to ten scans per second this way, and it catches virtually every key when waiting for a key to be pressed (the routine above does not; BASIC is slow at scrolling).

Now, finally, we'll cover mode 0, an unusual mode. In the program above, mode 3 was specified once, followed by calling mode 0. This "locks" the computer into mode 3 so all successive mode 0 scans are in mode 3 (refer to the definition of the modes above) until a non-zero mode is called. This is useful in applications programs, for example, an Extended BASIC database program that only uses upper-case characters as command letters. A single CALL KEY(3,K,S) at the beginning of the program will "lock" the entire program into upper-case. Likewise, modes 1 and 2 are affected by mode 0 in the same way. Unfortunately, CALL JOYST doesn't recognize mode 0 (it returns a * BAD VALUE error).

This should give programmers of all levels a little more insight into the powerful TI-99/4A. ●

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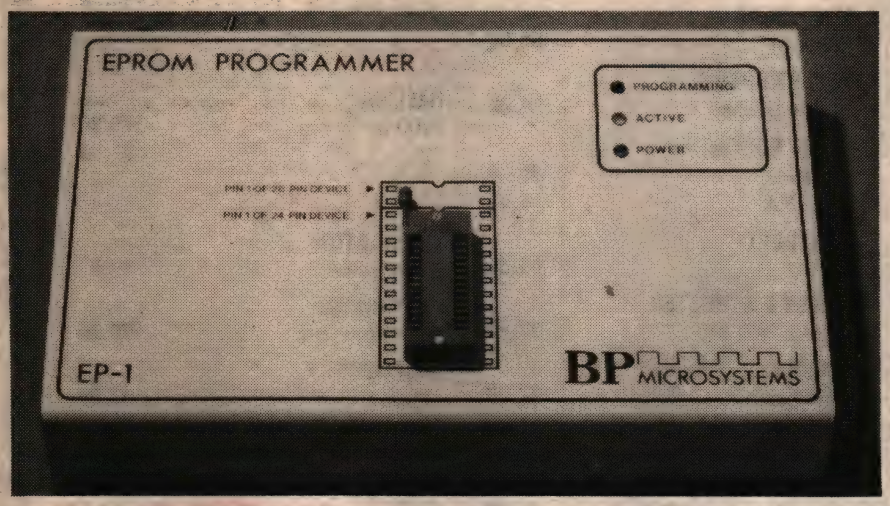
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Parallel Printer Program

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```
10 REM --------------------------------
20 REM PARALLEL PRINTER DRVER (PPD) 3.0
30 REM --------------------------------
40 REM  COMMODORE 64 USER PORT TO
50 REM  CENTRONICS (TM) PARALLEL
60 REM  PRINTER DRIVER PROGRAM
70 REM
80 REM    COPYRIGHT (C) 1986
90 REM    BY TED DRUDE
100 REM   ALL RIGHTS RESERVED.
110 REM
120 REM  BASIC ML PROGRAM GENERATOR
130 REM          VERSION 1.0
140 REM
150 REM  SHAREWARE DISTRIBUTION OF THIS
160 REM  PROGRAM AND THE ACCOMPANYING
170 REM  DOCUMENTATION IS AUTHORIZED.
180 REM  SEE DOCUMENTS FOR LIMITATIONS.
190 REM
200 REM  TO REGISTER THIS COPY OF PPD:
210 REM  SEND $10 (CASH, CK OR MO, MADE
220 REM  PAYABLE TO TED DRUDE) TO:
230 REM
240 REM    TED DRUDE
250 REM    C/O THE COMPUTER SHOPPER
260 REM    407 S. WASHINGTON AVE.
270 REM    TITUSVILLE, FL  32781
280 REM
290 REM  YOU WILL RECEIVE THE LATEST
300 REM  VERSION OF PPD AND BECOME AN
310 REM  AUTHORIZED USER, ELIGIBLE FOR
320 REM  CUSTOMER SUPPORT. THANK YOU
330 REM  FOR USING AND SUPPORTING
340 REM  PPD AND THE SHAREWARE CONCEPT.
350 REM
360 REM
370 PRINT CHR$(147)
380 PRINT " PPD ML PROGRAM GENERATOR"
390 PRINT
400 PRINT " NOW CHECKING DATA STATEMENTS"
410 PRINT " PLEASE STAND BY..."
420 PRINT
430 REM
440 REM COMPUTE CHECKSUM
450 BL=1
460 READ A : IF A<>256 THEN CK=CK+A : GOTO 460
470 PRINT "CHECKSUM FOR BLOCK";BL;"IS";CK;
480 READ C2
490 IF CK=C2 THEN PRINT "<- O.K." : GOTO 510
500 PRINT "<- ERROR"
510 BL=BL+1 : CK=0
520 IF BL< 6 GOTO 460
540 IF E THEN END:REM DATA ERRORS
550 REM
560 REM GET FILE NAME AND OPEN
570 PRINT
580 INPUT "NAME FOR PPD ML FILE";F$
590 IF F$="" GOTO 580
600 OPEN8,8,8,F$+",P,W"
610 GOSUB 740
620 PRINT#8,CHR$(1)+CHR$(4);
630 RESTORE
640 REM
650 REM MAIN LOOP
655 BL=1
660 READ A: IF A<>256 THEN PRINT#8,
CHR$(A); : GOTO 660
670 READ C2
680 BL=BL+1
690 IF BL<6 GOTO 660
700 CLOSE 8
710 END
720 REM
730 REM DISK ERROR CHECK
740 INPUT#8,E,E$,E1,E2
750 IF E=0 THEN RETURN
760 PRINT "DISK ERROR -";E;E$;E1;E2
770 END : REM DISK ERRORS
780 REM
790 REM BLOCK # 1 BEGINS
800 REM
810 DATA 11,8,10,0,158,50,48,54
820 DATA 49,0,0,0,32,231,8,32
830 DATA 244,8,32,244,8,32,244,8
840 DATA 201,129,240,6,169,70,32,210
850 DATA 255,96,165,25,240,35,32,244
860 DATA 8,133,53,32,244,8,133,54
870 DATA 165,55,56,229,53,133,55,133
880 DATA 27,133,51,133,53,165,56,229
890 DATA 54,133,56,133,28,133,52,133
900 DATA 54,165,27,133,29,165,28,133
910 DATA 30,160,0,32,244,8,133,26
920 DATA 201,5,240,33,201,128,144,3
930 DATA 32,211,8,165,26,41,127,201
940 DATA 4,208,21,32,244,8,24,101
950 DATA 27,133,29,32,244,8,101,28
960 DATA 133,30,76,84,8,76,16,9
970 DATA 201,1,208,20,32,244,8,24
980 DATA 101,27,32,218,8,32,244,8
990 DATA 101,28,32,218,8,76,84,8
1000 DATA 201,2,208,15,32,244,8,24
1010 DATA 101,27,32,218,8,32,244,8
1020 DATA 76,84,8,201,3,208,17,32
1030 DATA 244,8,24,101,27,32,244,8
1040 DATA 101,28,32,218,8,76,84,8
1050 DATA 201,96,48,13,41,159,170,232
1060 DATA 32,211,8,202,208,250,76,84
1070 DATA 8,0,32,244,8,32,218,8
1080 DATA 96,8,160,0,145,29,230,29
1090 DATA 208,2,230,30,40,96,169,29
1100 DATA 133,31,169,9,133,32,169,1
1110 DATA 133,25,96,8,165,31,197,45
1120 DATA 165,32,229,46,176,13,160,0
1130 DATA 177,31,230,31,208,7,230,32
1140 DATA 76,14,9,169,5,40,96,165
1150 DATA 27,141,17,3,165,28,141,18
1160 DATA 3,108,27,0,0,96,129,174
1170 DATA 5,129,76,57,0,96,255,96
1180 DATA 255,96,255,96,255,96,0,96
1190 DATA 0,96,0,96,4,96,1,96
1200 DATA 12,96,13,119,80,80,68,32
1210 DATA 40,51,46,48,41,32,45,32
1220 DATA 83,84,65,82,84,32,65,68
1230 DATA 68,82,58,32,96,0,96,0
1240 DATA 4,49,0,97,0,224,96,0
1250 DATA 96,0,96,0,96,0,1,0
1260 DATA 0,129,174,140,5,129,172,141
1270 DATA 5,96,56,98,32,141,255,129
1280 DATA 173,54,0,97,208,66,97,169
1290 DATA 255,129,141,54,0,97,162,0
1300 DATA 97,160,0,129,189,142,5,129
1310 DATA 153,105,5,129,189,143,5,129
1320 DATA 153,106,5,96,200,96,200,96
1330 DATA 200,96,232,96,232,97,224,23
1340 DATA 97,144,235,129,173,162,5,129
1350 DATA 174,163,5,129,141,100,5,129
1360 DATA 142,101,5,129,173,156,5,129
1370 DATA 174,157,5,129,141,94,5,129
1380 DATA 142,95,5,129,173,144,5,129
1390 DATA 141,82,5,129,173,145,5,129
1400 DATA 141,83,5,97,162,23,129,189
1410 DATA 80,5,129,157,142,5,96,202
1420 DATA 97,16,247,129,174,140,5,129
1430 DATA 256,45611 : REM END OF BLOCK 1
1440 REM
1450 REM BLOCK # 2 BEGINS
1460 REM
1470 DATA 172,141,5,96,24,96,120,98
1480 DATA 32,141,255,96,88,97,169,13
1490 DATA 98,32,210,255,97,162,0,129
1500 DATA 189,13,0,97,240,6,98,32
1510 DATA 210,255,96,232,97,208,245,129
1520 DATA 174,55,0,129,173,56,0,96
1530 DATA 168,97,165,1,97,41,1,97
1540 DATA 240,4,96,152,98,32,205,189
1550 DATA 129,32,201,0,96,24,96,96
1560 DATA 97,169,32,98,32,210,255,97
1570 DATA 169,40,98,32,210,255,97,169
1580 DATA 36,98,32,210,255,129,32,230
1590 DATA 0,97,169,41,98,32,210,255
1600 DATA 97,169,13,98,32,210,255,96
1610 DATA 96,129,173,56,0,129,32,239
1620 DATA 0,129,173,55,0,129,32,102
1630 DATA 3,96,72,96,152,98,32,210
1640 DATA 255,96,104,98,32,210,255,96
1650 DATA 96,97,165,184,97,208,5,97
1660 DATA 169,6,129,76,173,4,97,165
1670 DATA 186,129,205,10,0,97,240,3
1680 DATA 129,76,113,5,97,166,184,129
1690 DATA 32,141,4,97,208,5,97,169
1700 DATA 2,129,76,173,4,97,166,152
1710 DATA 97,224,10,97,144,5,97,169
1720 DATA 1,129,76,173,4,97,230,152
1730 DATA 98,157,89,2,97,165,185,129
1740 DATA 141,51,0,98,157,109,2,97
1750 DATA 165,186,98,157,99,2,97,169
1760 DATA 255,98,141,3,221,98,173,0
1770 DATA 221,97,9,4,98,141,0,221
1780 DATA 98,173,2,221,97,9,4,98
1790 DATA 141,2,221,97,169,127,98,141
1800 DATA 13,221,97,169,0,98,141,1
1810 DATA 221,129,173,8,0,97,240,3
1820 DATA 129,76,208,1,97,169,255,97
1830 DATA 160,5,96,136,129,153,3,0
1840 DATA 97,208,250,96,170,129,140,9
1850 DATA 0,129,173,51,0,97,201,255
1860 DATA 97,208,5,97,169,0,129,141
1870 DATA 51,0,129,44,51,0,97,80
1880 DATA 17,129,142,9,0,129,173,49
1890 DATA 0,97,133,167,97,133,169,129
1900 DATA 173,50,0,97,133,168,97,133
1910 DATA 170,129,173,51,0,97,41,31
1920 DATA 97,201,20,97,144,6,96,56
1930 DATA 97,233,20,129,142,8,0,129
1940 DATA 141,51,0,97,201,8,97,240
1950 DATA 37,97,201,7,97,240,36,97
1960 DATA 201,5,97,240,18,97,201,4
1970 DATA 97,144,4,97,169,1,97,208
1980 DATA 10,97,201,3,97,240,23,97
1990 DATA 201,1,97,240,8,97,208,6
2000 DATA 129,140,5,0,129,140,4,0
2010 DATA 129,140,6,0,97,208,3,129
2020 DATA 140,3,0,129,140,7,0,97
2030 DATA 162,0,129,189,39,0,97,240
2040 DATA 6,129,32,180,3,96,232,97
2050 DATA 208,245,96,24,96,96,129,32
2060 DATA 146,4,97,240,2,96,24,96
2070 DATA 96,129,32,157,4,97,165,186
2080 DATA 129,205,10,0,97,240,5,97
2090 DATA 165,184,129,76,116,5,97,198
2100 DATA 256,52796 : REM END OF BLOCK 2
2110 REM
2120 REM  BLOCK 3 BEGINS
2130 REM
2140 DATA 152,97,228,152,97,240,20,97
2150 DATA 164,152,98,185,99,2,98,157
2160 DATA 99,2,98,185,109,2,98,157
2170 DATA 109,2,98,185,89,2,98,157
2180 DATA 89,2,96,24,96,96,129,32
2190 DATA 141,4,97,240,5,97,169,3
2200 DATA 129,76,173,4,129,32,157,4
2210 DATA 97,165,186,129,205,10,0,97
2220 DATA 240,5,97,166,184,129,76,119
2230 DATA 5,97,169,6,129,76,173,4
2240 DATA 129,32,141,4,97,240,5,97
2250 DATA 169,3,129,76,173,4,129,32
2260 DATA 157,4,97,165,186,129,205,10
2270 DATA 0,97,240,5,97,166,184,129
2280 DATA 76,122,5,97,133,154,96,24
2290 DATA 96,96,97,165,153,129,205,10
2300 DATA 0,97,240,3,129,76,128,5
2310 DATA 97,169,6,129,76,173,4,96
2320 DATA 72,97,165,154,129,205,10,0
2330 DATA 97,240,4,96,104,129,76,131
2340 DATA 5,96,104,129,141,52,0,96
2350 DATA 138,96,72,96,152,96,72,129
2360 DATA 173,52,0,129,174,7,0,97
2370 DATA 240,11,129,32,102,3,97,162
2380 DATA 32,129,32,82,3,129,76,11
2390 DATA 3,129,174,6,0,97,240,23
2400 DATA 97,201,65,97,144,19,97,201
2410 DATA 91,97,144,10,97,201,193,97
2420 DATA 144,11,97,201,219,97,144,5
2430 DATA 97,176,5,97,9,32,96,44
2440 DATA 97,41,127,129,174,5,0,97
2450 DATA 240,36,97,224,255,97,240,21
2460 DATA 97,201,34,97,240,10,97,201
2470 DATA 13,97,240,6,129,32,20,3
2480 DATA 129,76,250,2,97,162,255,129
2490 DATA 142,5,0,97,208,59,97,201
2500 DATA 34,97,208,55,97,162,1,129
2510 DATA 142,5,0,97,208,48,129,174
2520 DATA 4,0,97,240,16,97,201,15
2530 DATA 97,208,4,97,169,20,97,208
2540 DATA 35,97,201,20,97,208,4,97
2550 DATA 169,21,97,208,27,129,174,6
2560 DATA 0,97,240,22,97,201,17,97
2570 DATA 208,7,97,162,7,129,142,51
2580 DATA 0,97,208,31,97,201,145,97
2590 DATA 208,7,97,162,0,129,142,51
2600 DATA 0,97,240,20,129,32,180,3
2610 DATA 97,201,13,97,208,10,129,174
2620 DATA 3,0,97,240,5,97,169,10
2630 DATA 129,32,180,3,129,141,52,0
2640 DATA 256,39830 : REM END OF BLOCK 3
2650 REM
2660 REM BLOCK # 4 BEGINS
2670 REM
2680 DATA 96,104,96,168,96,104,96,170
2690 DATA 129,173,52,0,96,24,96,96
2700 DATA 97,201,32,97,144,10,97,201
2710 DATA 128,97,144,50,97,201,161,97
2720 DATA 144,2,97,176,44,96,72,97
2730 DATA 169,123,129,32,180,3,96,104
2740 DATA 97,162,0,129,221,216,4,97
2750 DATA 240,13,96,232,97,224,57,97
2760 DATA 144,246,129,32,102,3,97,162
2770 DATA 36,129,76,73,3,96,138,96
2780 DATA 10,96,170,129,189,0,5,96
2790 DATA 168,129,189,1,5,97,162,0
2800 DATA 129,32,82,3,97,169,125,129
2810 DATA 32,180,3,96,96,96,72,96
2820 DATA 152,96,72,96,138,96,72,96
2830 DATA 104,97,240,3,129,32,180,3
2840 DATA 96,104,129,32,180,3,96,104
2850 DATA 129,32,180,3,96,96,96,72
2860 DATA 97,41,240,96,74,96,74,96
2870 DATA 74,96,74,129,32,120,3,96
2880 DATA 168,96,104,97,41,15,129,32
2890 DATA 120,3,96,96,97,201,10,97
2900 DATA 144,2,97,105,6,97,105,48
2910 DATA 96,96,96,72,97,165,170,97
2920 DATA 197,168,97,144,10,97,165,169
2930 DATA 97,197,167,97,144,4,97,240
2940 DATA 2,97,176,240,97,165,168,97
2950 DATA 201,255,97,144,16,97,165,167
2960 DATA 97,201,255,97,144,10,129,173
2970 DATA 49,0,97,133,167,129,173,50
2980 DATA 0,97,133,168,97,160,0,96
2990 DATA 104,97,145,167,97,230,167,97
3000 DATA 208,2,97,230,168,96,96,129
3010 DATA 44,9,0,97,16,6,96,72
3020 DATA 129,32,129,3,96,104,96,96
3030 DATA 129,32,42,4,96,72,98,173
3040 DATA 13,221,97,41,16,97,240,249
3050 DATA 96,104,96,96,96,120,129,173
3060 DATA 9,0,97,240,85,129,173,53
3070 DATA 0,97,240,19,98,173,13,221
3080 DATA 97,41,16,97,208,7,97,169
3090 DATA 255,129,141,53,0,97,208,66
3100 DATA 97,169,0,129,141,53,0,97
3110 DATA 165,170,97,197,168,97,208,9
3120 DATA 97,165,169,97,197,167,97,208
3130 DATA 3,129,76,39,4,97,160,0
3140 DATA 97,165,1,96,120,97,41,253
3150 DATA 97,133,1,96,170,97,177,169
3160 DATA 96,72,96,138,97,9,2,97
3170 DATA 133,1,97,230,169,97,208,15
3180 DATA 97,165,170,97,201,255,97,144
3190 DATA 7,129,173,50,0,97,133,170
3200 DATA 97,208,2,97,230,170,96,104
3210 DATA 129,32,42,4,97,169,255,129
3220 DATA 141,53,0,129,76,104,5,96
3230 DATA 72,98,141,1,221,98,173,0
3240 DATA 221,97,41,251,98,141,0,221
3250 DATA 97,162,16,96,202,97,208,253
3260 DATA 97,9,4,98,141,0,221,96
3270 DATA 104,96,96,97,165,153,129,205
3280 DATA 10,0,97,240,3,129,76,137
3290 DATA 5,97,169,6,129,76,173,4
3300 DATA 96,72,96,138,96,72,96,152
3310 DATA 96,72,98,32,2,253,97,208
3320 DATA 3,98,108,2,128,98,32,234
3330 DATA 255,98,32,225,255,97,208,33
3340 DATA 98,32,138,255,98,32,132,255
3350 DATA 98,32,129,255,129,32,57,0
3360 DATA 129,173,11,0,98,141,33,208
3370 DATA 129,173,12,0,98,141,32,208
3380 DATA 97,165,1,97,41,1,97,240
3390 DATA 3,98,108,2,160,96,104,96
3400 DATA 168,96,104,96,170,96,104,96
3410 DATA 64,97,169,0,97,133,144,96
3420 DATA 138,97,166,152,96,202,97,48
3430 DATA 256,63228 : REM END OF BLOCK 4
3440 REM  BLOCK # 5 BEGINS
3450 REM
3460 DATA 5,98,221,89,2,97,208,248
3470 DATA 96,96,98,189,89,2,97,133
3480 DATA 184,98,189,99,2,97,133,186
3490 DATA 98,189,109,2,97,133,185,96
3500 DATA 96,96,72,98,32,204,255,97
3510 DATA 160,0,97,36,157,97,80,18
3520 DATA 129,185,204,4,98,32,210,255
3530 DATA 96,200,97,201,12,97,208,245
3540 DATA 96,104,96,72,97,9,48,98
3550 DATA 32,210,255,96,104,96,56,96
3560 DATA 96,107,73,47,79,32,69,82
3570 DATA 82,79,82,32,35,32,96,5
3580 DATA 96,8,96,9,96,14,96,17
3590 DATA 96,18,96,19,96,20,96,28
3600 DATA 96,29,96,30,96,31,96,129
3610 DATA 96,133,96,134,96,135,96,136
3620 DATA 96,137,96,138,96,139,96,140
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Program continued on page 174

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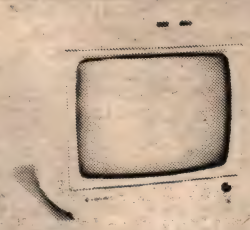
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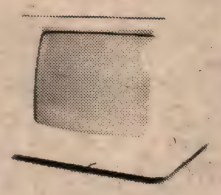


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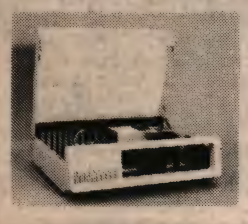
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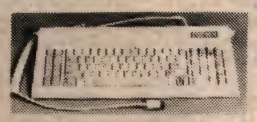
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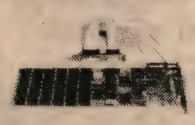
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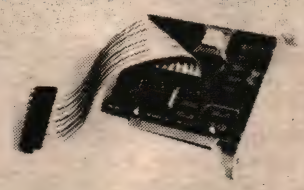


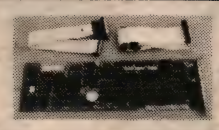
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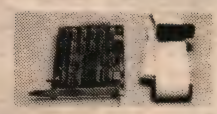
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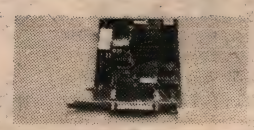




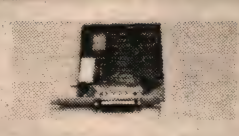
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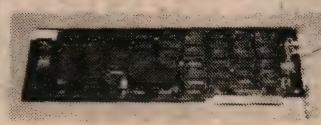
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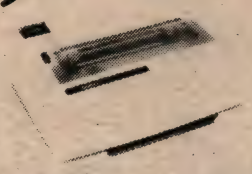
MONOCHROME CARD
$69.95



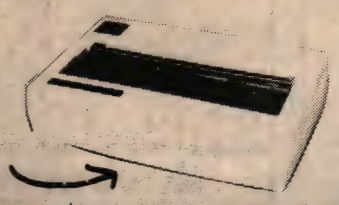
MONOGRAPHICS CARD
W/PARALLEL PRINTER PORT
$89.95

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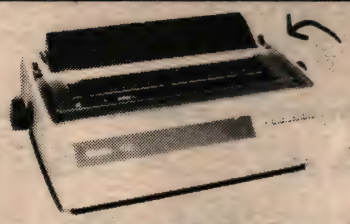
Printers



Diablo P-11
Dot Matrix Printer
9 x 7 dot matrix—prints single sheets of standard stationary as well as pin-fed stock. Standard carriage (8½ standard to 9½ pin stock). 100 C.P.S. 2K byte buffer. Bi-directional. Parallel port.
$189.00

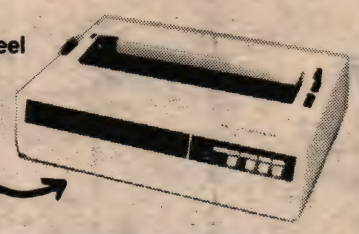


Diablo P-31
Dot Matrix Printer
Same specs as the P-11, but with the wide carriage (15") Bi-directional **$289.00**



Diablo 620
Daisy Wheel
Letter quality—prints single sheets of up to 15" wide stationary as well as pin-fed stock. 15"carriage. 20 C.P.S. Serial port. **$475.00**

Adeus CP 2000 Daisy Wheel
Letter quality—prints single sheets of up to 13½ wide stationary as well as pin-fed stock. 13½ carriage. 22 C.P.S. Bi-directional. Qume/Diablo compatible. Parallel port.
$395.00 (For sheet feed options see the Adeus-Easifeed 230)





Adeus Tractor Feeder
Paper size—width: max. 12" Paper empty indicator switch, Bi-directional **$85.00**

★★★★

Adeus-Easifeed 230 Sheet Feeder
Paper size—length: min. 8.3", max. 11.7"
width: min. 5.8", max. 8.5"
Paper weight: 16-26 lbs.
120 sheet capacity **$85.00**

One Source.

64K PARALLEL PRINTER BUFFER



Centronics female connections

$95.00

64K UNIVERSAL PRINTER BUFFER INTERFACE

SERIAL TO SERIAL
PARALLEL TO PARALLEL
PARALLEL TO SERIAL
SERIAL TO PARALLEL



$195.00

SOLVE YOUR INTERCONNECTION PROBLEMS WITH OUR PROBLEM SOLVERS

DB-25 (RS-232)

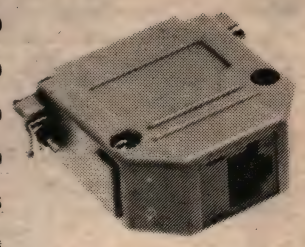


- GENDER CHANGER (AGC-M, AGC-F) **$7.95**
- GENDER CHANGER (AGC-36M, AGC-36F) **$16.95**
- NULL MODEM ADAPTOR **$9.95**
- MINI PATCH BOX **$9.95**
- MINI TESTER **$19.95**
- SURGE PROTECTOR **$14.95**

MODULAR TO RS-232 ADAPTER KITS

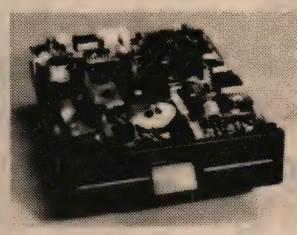
Turns any 25 pin serial port to a modular jack, in either 4, 6, or 8 position. Use these with the modular cable assemblies to make your own custom cables.

- MA-4M—RS-232 MALE TO 4 PIN MODULAR **4.50**
- MA-4F—RS-232 FEMALE TO 4 PIN MODULAR **4.50**
- MA-6M—RS-232 MALE TO 6 PIN MODULAR **4.50**
- MA-6F—RS-232 FEMALE TO 6 PIN MODULAR **4.50**
- MA-8M—RS-232 MALE TO 8 PIN MODULAR **4.95**
- MA-8F—RS-232 FEMALE TO 8 PIN MODULAR **4.95**



See following page for Modular Cable Assemblies.

QUMETRAK



½ HEIGHT FLOPPY DRIVE

360K

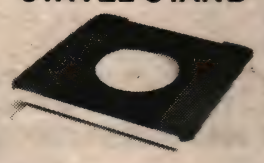
$89.95

SEAGATE HARD DRIVES

FOR P.C.'s or A.T.'s

20 MEG. HARD DRIVE ST-225, 80 MS AVE. ACCESS TIME	$449.95
20 MEG. HARD DRIVE 4026, 40 MS AVE. ACCESS TIME	$695.95
20 MEG. HARD DRIVE ST-225, 80 MS, W/CONTROLLER CARD	$549.95
20 MEG. HARD DRIVE 4026, 40 MS, W/CONTROLLER CARD	$795.95

COMPUTER MONITOR SWIVEL STAND



- Helps to eliminate eye and muscle strain caused by incorrect positioning of screen.
- Tiltable 12.5°° up and down.
- Can revolve 360°

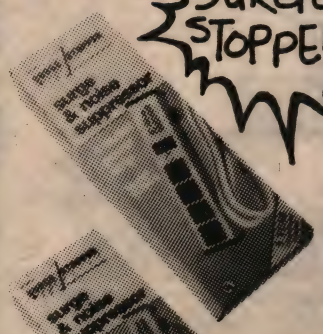
only **$12.95**

The source.

SURGE STOPPER

OUTLET STRIPS

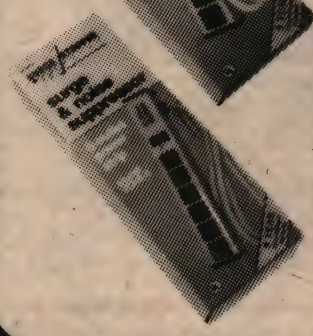
Protect your valuable equipment from surge spikes that destroy IC's and valuable data. Master on/off, power on light, circuit breaker, beige enamel case.



VCN4-6

4 circuit with surge and noise suppression

$24.95



VCN6-6

6 circuit with surge and noise suppression

$34.95

CUBE SURGE PROTECTORS



Here's a lot of protection in a small package.

- Easily transportable
- Low cost protection

$4.95

DATA TRANSFER SWITCHES



Features: **• STRONG METAL CASE • RFI/EMI PROTECTION • NO POWER REQUIRED • GOLD PLATED CONTACTS • COMPACT, BUILT TO LAST**

(SERIAL-25 PIN)		(PARALLEL-36 PIN)	
AB25-2 2 PORT SERIAL (25 PIN)	65.00	AB36-3 3 PORT PARALLEL	107.50
AB25-3 3 PORT SERIAL (25 PIN)	82.50	AB36-4 4 PORT PARALLEL	120.00
AB25-4 4 PORT SERIAL	95.00	AB36-5 5 PORT PARALLEL	145.00
AB25-5 5 PORT SERIAL	115.00	AB25-X SERIAL CROSSOVER SWITCHBOX	87.50
AB36-2 2 PORT PARALLEL	92.50	AB36-X PARALLEL CROSSOVER SWITCHBOX	117.50

Economy PUSHBUTTON SWITCHBOXES



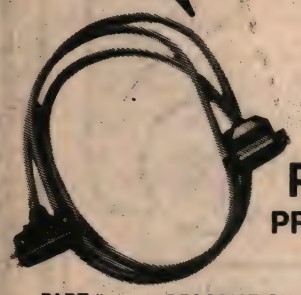
Features: **•INEXPENSIVE PLASTIC CASE FOR USE IN LOW RFI/EMI AREAS •NO POWER REQUIRED •PUSHBUTTON OPERATION •LIGHTWEIGHT**

AB25-PB 2 PORT SERIAL **44.00** **AB36-PB** 2 PORT PARALLEL **54.00**

CONTINUED FROM THE PAST PAGE

At **ALTEX ELECTRONICS, INC.** we carry every major cable assembly to help you with your cable needs. Plus, we offer an exclusive custom cable service.

★ROUND CABLE ASSEMBLIES★



IBM PARALLEL PRINTER CABLES

PART #	DESCRIPTION	PRICES
PPC301-6	6 ft.	10.40
PPC301-10	10 ft.	12.00
PPC301-15	15 ft.	19.95
PPC301-25	25 ft.	24.95

IBM CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
ATSC-6	6 ft. AT serial printer cable	14.95
KEC-10	10 ft. keyboard extention	3.95
MEC-10	10 ft. monitor extention	3.95
RGB-3	3 ft. RGB monitor cable	8.95
VMC-10	10 ft. video cable RCA to RCA	2.50
DDC-22	dual floppy controller cable	6.95
HDC-22	hard drive controller cable	7.95
MPC-6	power cord	3.95

DB25 CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
25MM-6	6 ft. male to male	14.95
25MM-10	10 ft. male to male	19.95
25MM-25	25 ft. male to male	24.95
25MF-6	6 ft. male to female	14.95
25MF-10	10 ft. male to female	19.95
25MF-25	25 ft. male to female	24.95

CENTRONICS CABLE ASSEMBLIES (36 pin male to male)

PART #	DESCRIPTION	PRICES
36MM-6	6 ft.	14.95
36MM-10	10 ft.	19.95

F-CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
JCF-3	3 ft. F to F cable	0.95
JCF-6	6 ft. F to F cable	1.25
JCF-12	12 ft. F to F cable	1.95
JCF-25	25 ft. F to F cable	3.75
JCF-50	50 ft. F to F cable	6.50
JCF-100	100 ft. F to F cable	11.95



BNC-CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
JCB58	BNC male to male RG-58	4.25 + .15 per foot
JCB59	BNC male to male RG-59	3.95 + .10 per foot
JCB62	BNC male to male RG-62	4.25 + .10 per foot

TWINAXIAL CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICES
JCTWX	twinaxial male to male	16.00 + .50 per foot

MISC. CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
CC1	Atari cable 13 pin male to female	11.88	9.50	8.64
CC2	Atari int. to parallel printer	13.13	10.50	9.55
CC4	5 pin din to 4 RCA plugs	3.60	2.88	2.62
CC8	6 pin din male to male	3.50	2.80	2.55
CC11	RGB monitor cable	9.13	7.30	6.64
JYA	joystick "Y" adapter	4.00	3.20	2.91

MODULAR CONNECTIONS

MODULAR CABLE ASSEMBLIES (plug to plug)

PART #	DESCRIPTION	PRICES
MC-4	4 pin cable	1.00 + .09 ft.
MC-6	6 pin cable	1.00 + .12 ft.
MC-8	8 pin cable	1.25 + .15 ft.

MODULAR PLUGS

PART #	DESCRIPTION	EA	100 EA
MP-4M	4 pin mini handset modular	0.25	14.95
MP-4	4 pin modular plug 4 x 6	0.25	14.95
MP-6	6 pin modular plug 6 x 6	0.25	15.95
MP-8	8 pin modular plug 8 x 8	0.35	26.95

MODULAR WIRE

PART #	DESCRIPTION	PRICES
MW4-100	100 ft. 4 conductor	6.95
MW4-500	500 ft. 4 conductor	29.95
MW4-1000	1000 ft. 4 conductor	49.95
MW6-100	100 ft. 6 conductor	8.95
MW6-500	500 ft. 6 conductor	39.95
MW6-1000	1000 ft. 6 conductor	64.95
MW8-100	100 ft. 8 conductor	12.95
MW8-500	500 ft. 8 conductor	54.95

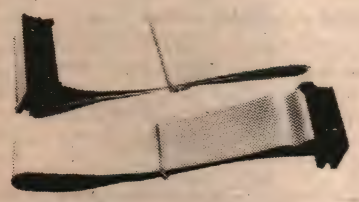
(1)(512) 828-0503 (1)(512) 828-0503 (1)(512) 828-0503 (1)(512) 828-0503

ASK ABOUT OUR EXCLUSIVE CUSTOM CABLE SERVICES

One Source. ALTEX ELECTRONICS, INC.

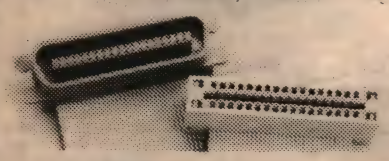
★RIBBON CABLE ASSEMBLIES★

We carry pre-assembled ribbon cables for your particular applications and offer custom ribbon cable services.



HARD DRIVE CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
HDC-22	22" hard drive cable assy.	8.50	7.73	7.06



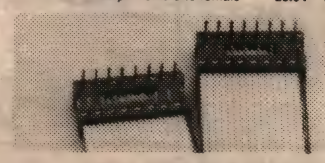
RADIO SHACK PARALLEL PRINTER CABLE

PART #	DESCRIPTION	PRICE
36P-34E	36 pin male 34 pin edg.crd.	8.50 + .68 per ft.



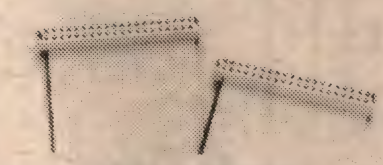
D-SERIES

PART #	DESCRIPTION	PRICE
9P-9P	9 pin male to male	5.64 + .18 per ft.
9P-9S	9 pin male to female	5.86 + .18 per ft.
9S-9S	9 pin female to female	6.08 + .18 per ft.
15P-15P	15 pin male to male	7.44 + .30 per ft.
15P-15S	15 pin male to female	7.62 + .30 per ft.
15S-15S	15 pin female to female	7.80 + .30 per ft.
25P-25P	25 pin male to male	8.96 + .50 per ft.
25P-25S	25 pin male to female	9.62 + .50 per ft.
25S-25S	25 pin female to female	10.28 + .50 per ft.
37P-37P	37 pin male to male	11.40 + .74 per ft.
37P-37S	37 pin male to female	12.46 + .74 per ft.
37S-37S	37 pin female to female	13.52 + .74 per ft.
50P-50P	50 pin male to male	25.96 + 1.00 per ft.
50P-50S	50 pin male to female	27.45 + 1.00 per ft.
50S-50S	50 pin female to female	28.94 + 1.00 per ft.



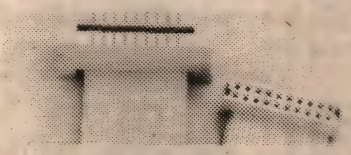
IDD DIP PLUG TO IDD DIP PLUG

PART #	DESCRIPTION	PRICE
14D-14D	14 pin dip plug cable	2.60 + .20 per ft.
16D-16D	16 pin dip plug cable	2.75 + .32 per ft.
24D-24D	24 pin dip plug cable	3.75 + .48 per ft.
40D-40D	40 pin dip plug cable	7.50 + .80 per ft.



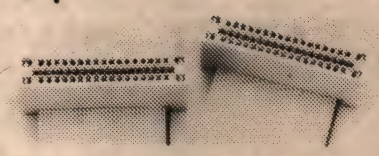
IDS SOCKET TO IDS SOCKET

PART #	DESCRIPTION	PRICE
10S-10S	10 pin socket to socket	2.00 + .20 per ft.
14S-14S	14 pin socket to socket	2.50 + .28 per ft.
16S-16S	16 pin socket to socket	2.75 + .32 per ft.
20S-20S	20 pin socket to socket	2.85 + .40 per ft.
26S-26S	26 pin socket to socket	3.50 + .52 per ft.
34S-34S	34 pin socket to socket	4.10 + .68 per ft.
40S-40S	40 pin socket to socket	4.50 + .80 per ft.
50S-50S	50 pin socket to socket	6.15 + 1.00 per ft.
60S-60S	60 pin socket to socket	6.65 + 1.20 per ft.



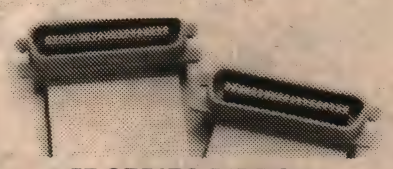
IDS SOCKET TO IDE EDGCARD

PART #	DESCRIPTION	PRICE
10S-10E	10 pin socket to edg.crd.	3.20 + .20 per ft.
14S-14E	14 pin socket to edg.crd.	3.50 + .28 per ft.
20S-20E	20 pin socket to edg.crd.	3.75 + .40 per ft.
26S-26E	26 pin socket to edg.crd.	4.75 + .52 per ft.
34S-34E	34 pin socket to edg.crd.	5.40 + .68 per ft.
40S-40E	40 pin socket to edg.crd.	6.45 + .80 per ft.
50S-50E	50 pin socket to edg.crd.	7.85 + 1.00 per ft.



IDE EDGECARD TO IDE EDGCARD

PART #	DESCRIPTION	PRICE
10E-10E	10 pin edg.crd. to edg.crd.	3.80 + .20 per ft.
14E-14E	14 pin edg.crd. to edg.crd.	4.00 + .28 per ft.
20E-20E	20 pin edg.crd. to edg.crd.	4.50 + .40 per ft.
26E-26E	26 pin edg.crd. to edg.crd.	5.30 + .52 per ft.
34E-34E	34 pin edg.crd. to edg.crd.	5.90 + .68 per ft.
40E-40E	40 pin edg.crd. to edg.crd.	7.00 + .80 per ft.
50E-50E	50 pin edg.crd. to edg.crd.	8.50 + 1.00 per ft.



57 SERIES RIBBON CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE
5724P-P	24 pin male to male	10.00 + .48 per ft.
5724P-S	24 pin male to female	10.50 + .48 per ft.
5724S-S	24 pin female to female	11.00 + .48 per ft.
5736P-P	36 pin male to male	8.00 + .72 per ft.
5736P-S	36 pin male to female	10.00 + .72 per ft.
5736S-S	36 pin female to female	12.00 + .72 per ft.
5750P-P	50 pin male to male	16.75 + 1.00 per ft.
5750P-S	50 pin male to female	16.25 + 1.00 per ft.
5750S-S	50 pin female to female	15.75 + 1.00 per ft.

CONTINUED ON THE FOLLOWING PAGE →

and, last but NOT least!

We have the connectors you're looking for—

One Source • Altex Electronics, Inc.

D-SERIES CONNECTORS

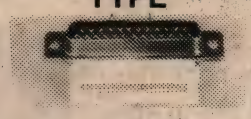
P = MALE
S = FEMALE

SOLDER POT



PART #	PRICE/QTY 1-49	50-99	100-499
9P	0.84	0.76	0.70
9S	0.96	0.87	0.80
15P	0.96	0.87	0.80
15S	1.10	1.00	0.92
25P	1.10	1.00	0.92
25S	1.20	1.09	1.00
37P	1.64	1.49	1.37
37S	1.80	1.64	1.50
50P	2.62	2.38	2.18
50S	3.70	3.36	3.08

RIBBON CABLE TYPE



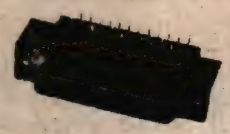
PART #	PRICE/QTY 1-49	50-99	100-499
1DC9P	2.35	2.17	2.01
1DC9S	2.53	2.34	2.17
1DC15P	3.10	2.86	2.66
1DC15S	3.25	3.00	2.79
1DC25P	3.73	2.45	3.20
1DC25S	4.28	3.95	3.67
1DC37P	4.75	4.38	4.07
1DC37S	5.63	5.20	4.83
1DC50P	12.98	11.98	11.13
1DC50S	14.47	13.35	12.40

PC MOUNT STRAIGHT



PART #	PRICE/QTY 1-49	50-99	100-499
P9P	0.90	0.82	0.75
P9S	1.38	1.25	1.15
P15P	1.12	1.02	0.93
P15S	1.98	1.80	1.65
P25P	1.56	1.42	1.30
P25S	3.06	2.78	2.55
P37P	2.14	1.95	1.78
P37S	4.36	3.96	3.63
P50P	2.74	2.49	2.28
P50S	5.68	5.16	4.73

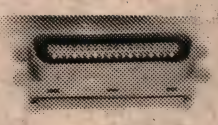
PC MOUNT RIGHT ANGLE



PART #	PRICE/QTY 1-49	50-99	100-499
R9P	1.60	1.45	1.33
R9S	1.62	1.47	1.35
R15P	1.52	1.38	1.27
R15S	1.54	1.40	1.28
R25P	1.96	1.78	1.63
R25S	1.98	1.80	1.65
R37P	2.94	2.67	2.45
R37S	2.98	2.71	2.48

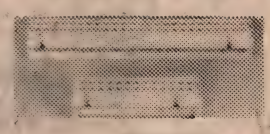
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57 SERIES CONNECTORS



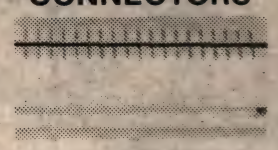
PART #	PRICE/QTY 1-49	50-99	100-499
1D57-24P	5.00	4.62	4.29
1D57-24S	5.50	5.08	4.71
1D57-36P	4.25	3.78	3.40
1D57-36S	5.50	5.00	4.58
1D57-50P	8.03	7.42	6.89
1D57-50S	7.52	6.94	6.44

IDS SOCKET CONNECTORS



PART #	PRICE/QTY 1-49	50-99	100-499
IDS10	0.94	0.85	0.78
IDS14	1.00	0.91	0.83
IDS16	1.12	1.02	0.93
IDS20	1.18	1.07	0.98
IDS26	1.50	1.36	1.25
IDS34	1.78	1.62	1.48
IDS40	1.98	1.80	1.65
IDS50	2.32	2.11	1.93
IDS60	2.70	2.45	2.25

IDE EDGE CARD CONNECTORS

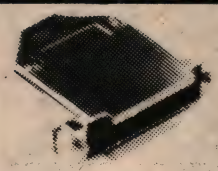


PART #	PRICE/QTY 1-49	50-99	100-499
IDE10	1.30	1.16	1.04
IDE14	1.55	1.38	1.24
IDE20	1.75	1.56	1.40
IDE26	2.13	1.89	1.70
IDE34	2.50	2.22	2.00
IDE40	2.88	2.56	2.30
IDE50	3.50	3.11	2.80

IDD DIP PLUG CONNECTORS



PART #	PRICE/QTY 1-49	50-99	100-499
IDD14	0.85	0.77	0.71
IDD16	0.95	0.86	0.79
IDD24	1.65	1.50	1.38
IDD40	2.75	2.50	2.29



AMP HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
AH25	1.25	1.00	0.83

DUAL HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
DH25	1.13	1.00	0.90
DG37	1.17	1.04	0.94

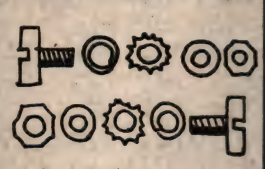
GREY HOODS

PART #	PRICE/QTY 1-49	50-99	100-499
GH9	0.68	0.60	0.54
GH15	0.80	0.71	0.64
GH25	0.85	0.76	0.66
GH37	1.06	0.96	0.88
GH50	1.10	1.00	0.92

SHIELDED HOODS

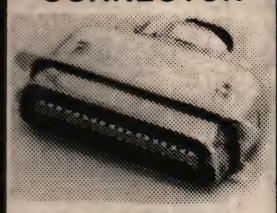
PART #	PRICE/QTY 1-49	50-99	100-499
SH9	0.80	0.71	0.64
SH15	0.88	0.78	0.70
SH25	1.00	0.89	0.80
SH37	1.72	1.56	1.43

D-SERIES HARDWARE



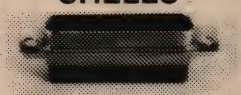
PART #	PRICE/QTY 1-49	50-99	100-499
MDH-1	0.55	0.35	0.25
Male d-series hardware			
FDH-1	0.75	0.65	0.55
Female d-series hardware			

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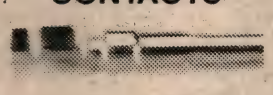
PART #	PRICE/QTY 1-49	50-99	100-499
CEN-36P	3.00	2.67	2.40
CEN-36S	3.66	3.33	3.05

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PART #	PRICE/QTY 1-49	50-99	100-499
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C9S	0.70	0.62	0.56
C15P	0.73	0.64	0.58
C15S	0.73	0.64	0.58
C25P	0.75	0.67	0.60
C25S	0.75	0.67	0.60
C37P	0.96	0.87	0.80
C37S	1.00	0.91	0.83
C50P	1.12	1.02	0.93
C50S	1.14	1.04	0.95

CRIMP CONTACTS



PART #	PRICE/QTY 1-99	100-999	1000-4999
CP20P	0.080	0.063	0.050
CP20S	0.100	0.068	0.054

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PART #	PRICE/QTY 1-9	10-24	25-49
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WP-2	2.13	1.55	1.42

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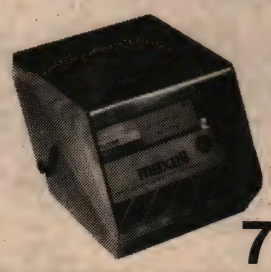


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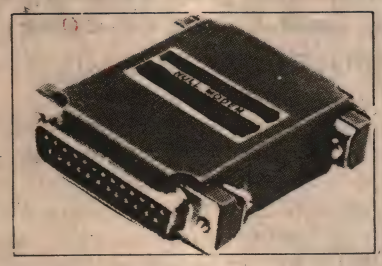
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Parallel Printer Driver continued from page 138

lems between software and printers. Some printers have a built-in hex dump mode with this same feature. The PPD hex dump mode works even if your printer doesn't have it built in.

IRQ Buffer Enable

One of the more advanced features of PPD is the built-in IRQ interrupt print buffer. The standard 3.0 version of PPD supports and 8K buffer. (Larger ones are planned for later version.) When enabled, characters are not sent directly to the printer, but are first "spooled" into an 8K RAM buffer underneath the KERNAL ROMs. (The RAM under the KERNAL normally isn't used, so the IRQ buffer should work with most programs.)

During system interrupts, PPD then retrieves from the buffer and sends them to the printer. This can speed up printing considerably. Smaller files can be "dumped" completely to the buffer and printed transparently "in the background," while you are running other BASIC programs in the "foreground." (This is a very limited form of "multitasking" running two programs on the same computer a once.) Because the actual printing only occurs during interrupts, there is little (if any) noticable degradation in system performance.

Because of potential conflicts in NMI and IRQ routines, I decided to disable the buffer by default. This inkes is necessary to switch in the IRQ buffer with an explicit second address command. This is done by adding 64 to the "Base" secondary address (one of the print modes). For example, to switch in the upper and lower case ASCII mode, with added linefeeds and enable the IRQ buffer, you would use the syntax:

"OPEN 4,4,7 + 64"

The second address of 7 selects the ASCII mode with added linefeeds, adding 64 to it turns the IRQ buffer on.

You may actually use the expression "7 + 64" in the OPEN statement and it will be accepted.

"Locking" a Mode

You may "lock" PPD into any one of the above modes by simply adding a 20 to the "base" second address (just like adding a 64 to the base address turns on the buffer). After receiving a "locked" second address, PPD will stay in that mode indefinitely. If the parallel printer device is CLOSEd and then OPENed again later, the new second address in the second OPEN command will be ignored, and the previous second address will be kept intact.

This provides a mechanism for overriding software that insists on sending the wrong second addresses to your printer. You can specify the correct configuration ahead of time, using an OPEN statement and locking it, before you run the offending software, and then be assured that PPD will stay in the mode you have selected.

For example, if you want to lock PPD into the PETSCII mode, enabling the buffer, with added linefeeds, you would use the syntax:

"OPEN 4,4,0 + 64 + 20"

The second address of "0"

continued on page 175

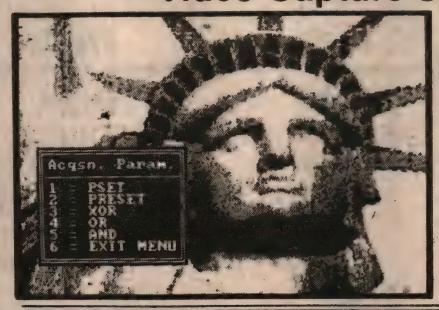
Parallel Printer Program continued from page 169

```
3630 DATA 96,141,96,142,96,144,96,145
3640 DATA 96,146,96,147,96,148,96,149
3650 DATA 96,150,96,151,96,152,96,153
3660 DATA 96,154,96,155,96,156,96,157
3670 DATA 96,158,96,159,96,160,119,87
3680 DATA 72,68,67,69,67,76,79,67
3690 DATA 68,82,86,72,79,68,69,82
3700 DATA 68,67,82,71,78,66,76,113
3710 DATA 79,82,70,49,70,51,70,53
3720 DATA 70,55,70,50,70,52,70,54
3730 DATA 70,56,109,83,82,85,80,66
3740 DATA 75,67,85,82,79,83,67,73
3750 DATA 78,109,66,82,76,82,71,49
3760 DATA 71,50,76,71,76,66,71,51
3770 DATA 105,80,85,67,76,89,69,67
3780 DATA 89,83,83,1,204,3,97,0
3790 DATA 0,1,81,4,1,252,0,1
3800 DATA 223,1,1,17,2,1,47,2
3810 DATA 97,0,0,1,76,2,1,91
3820 DATA 2,97,0,0,1,66,4,96
3830 DATA 76,4,107,5,96,76,4,110
3840 DATA 5,96,76,4,113,5,96,76
3850 DATA 4,116,5,96,76,4,119,5
3860 DATA 96,76,4,122,5,96,76,4
3870 DATA 125,5,96,76,4,128,5,96
3880 DATA 76,4,131,5,96,76,4,134
3890 DATA 5,96,76,4,137,5,96,76
3900 DATA 4,140,5,1,142,5,4,172
3910 DATA 5,97,0,0
3920 DATA 256,29931 : REM END OF BLOCK 5
```

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Parallel Printer Driver continued from page 174

specifies PETSCII mode with linefeeds, the "64" enables the IRQ buffer, and the "20" tells PPD to lock this configuration.

You should exercise caution when locking a configuration, because, if you make a mistake, it can be difficult to "unlock" the wrong one. (It was deliberately made difficult to unlock a locked mode, in order for it to be effective.)

To "unlock" a locked mode, you have to zero the proper internal register inside PPD (described in customization section). If you have made a mistake in locking the wrong mode (and don't want to go to the trouble of finding and POKEing the register with a zero), you can always reboot a new copy of PPD, and try again.

Re-Initializing The Program

After running the installation program, PPD will normally "stay resident" until the computer is shut off. Since the NMI routine is wedged, a simple "RUN/STOP-RESTORE" will not disconnect PPD from the system. Instead, PPD will be automatically re-wedged back in. As long as the PPD RAM area hasn't been "trashed" somehow, it should continue to operate normally.

Sometimes, rapidly repeated "RUN/STOP-RESTORE"sequences will disconnect PPD (haven't found a patch to this yet). The only way to reconnect it, in that case, is to SYS to the start address of PPD (which was printed out in it's sign-on message). If you can't remember what the address was, you may be able to find it by typing:

"PRINT PEEK(55) + PEEK(56) * 256"

This should give you the start address of PPD, assuming you haven't run any other software that has modified the pointer at 55-56 (top of memory).

BE AWARE, that if the IRQ buffer is active (and printing) a "RUN/STOP-RESTORE" will clear it. In other words, you will lose the contents of the buffer during a warm reset, so don't do a "RUN/STOP-RESTORE" unless you want to abort the IRQ buffer. If the IRQ buffer is "running wild" on you, however, "RUN-STOP/RESTORE" will cancel it for you.

Compatibility With Other Software

When initialized, PPD wedges into the KERNAL vectors and takes control of several key KERNAL routines, including the IRQ and NMI interrupt routines. Software that obeys the KERNAL standard should work fine with PPD. Some programs (notably utilities), like to grab the IRQ and NMI vectors for their own use. These may or may not work with PPD. Every effort was made in writing PPD to make it work with other "interrupt grabbers," but you may have to experiment with the "loading order" (which program is loaded and run first), to see what works.

Because the NMI routine is re-routed, NMI interrupts are no longer handled by the KERNAL. This was done to make sure that PPD would be auto-reinstalled when a "RUN/STOP-RESTORE" occurred. The only real loss is that the RS-232 channel is no longer

continued on page 178

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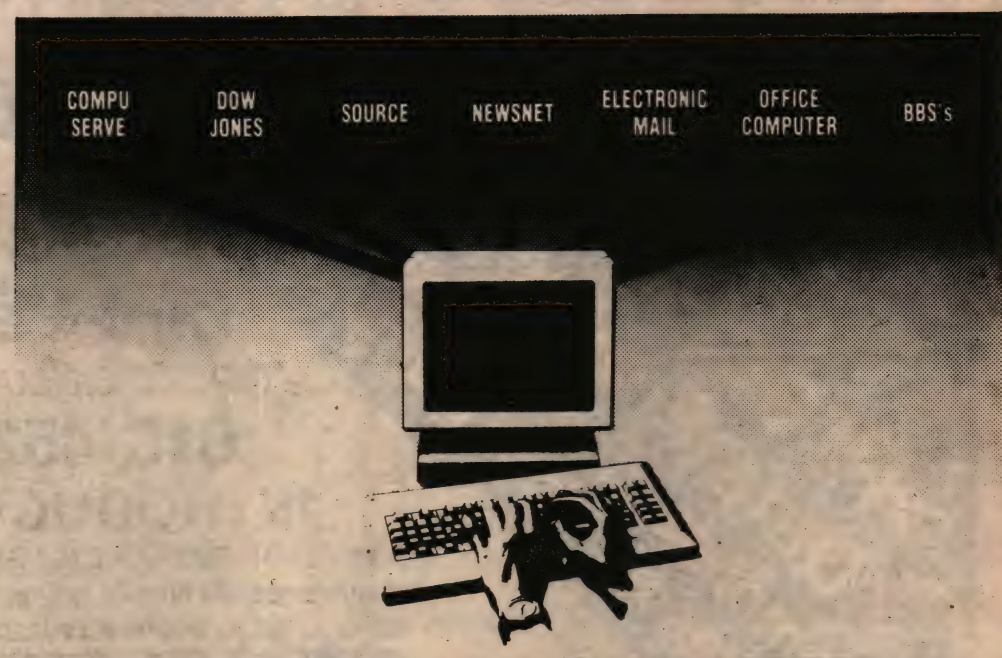
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continued from page 137

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Once you've made the settings for the number you are about to call, you may store them automatically in a terminal file. From the command menu at the top of your screen, select Phone. Now a requester will allow you to type in the primary and secondary numbers for that terminal--another auto feature that causes Online to dial the second number if the first is busy. Now check to see that your parameters are set correctly and, if all is in order, go to the Service menu and select Service Archive.

When the requester appears, select Store then click on the line requester and type in a filename such as "Source"-for the popular information service, or "Phred"--for your weird friend on the other side of town. Add a comment on the next requester line if you wish, then click on "OK" and save.

Now that it is on your disk as a terminal file--suffix ".trm"--you can get online more quickly next time by going to Archive Get, clicking on the filename, and sipping a soda while Online sets the proper parameters and dials the number for you. Even faster, if you have your disk set for the command Line Interface (CLI), you can simply boot and dial by typing "ONLINE! PHRED." Automation can be carried only so far, however, you will have to communicate with Phred on your own.

On second thought, it may be possible to set up an elaborate script file so that Phred would think you were responding to him, and...

A script file is an extended form of automated calling and Online supports the creation of a script file for each number you might frequently call. In creating a terminal file, you were simply teaching Online how to make a call for you, much like telling a child which buttons to press on the phone but without teaching him any of the conversational protocols: "Hello. This is Tommy. May I speak to..."

With a script file, which is somewhat similar to a program or a batch file, Online will carry out all the protocols of, as an example, logging on to CompuServe, presenting your password and/or account number, even going directly to your area of interest and downloading a specific file. With a script file in place, all this can be accomplished without your ever having to touch the keyboard, thereby reducing your own involvement almost to zero.

By using the "learn" mode, a script file can be created quickly and easily. Simply call the bulletin board or service and log in normally. When you reach a prompt to which you must respond simply press the ALT and L keys, type in your response and, where you would normally hit RETURN, type "|" known as a shift-backslash. When you've gone through the entire routine and are where you wish to be on the BBS or the service, go back to the Service Archive on the pull-down menu.

Assuming you have already created a terminal file to do the parameter setting and dialing, select that name from the list and then select Replace. Now the two files, with the same name but with different suffixes (.trm for the terminal file and .scp for the script file) are linked.

Next time you call, select the terminal file and it will set the parameters, dial, go through all the checkpoints and deposit you exactly where you wish to be.

In fact, when you first access the Archives menu, you'll find that one terminal file has already been installed: you have automatic dialing and sign-on to the Micro-Systems 24-hour bulletin board service, where Sysops can answer your questions about Online.

For downloading files, you select Capture Open from the pull-down menus. This allows you to set aside a portion of RAM as a capture buffer and, although it can be larger, 64K is the suggested maximum for the buffer. If you'll be downloading longer files, Online suggests you capture direct to disk.

To do this, select Capture Open. You'll get the prompt for buffer size, but now you reduce that figure to 1K. At the filename prompt, you then enter the filename and the path, as in "DFO:'filename'" or "DF1:'filename'." If you have only a single drive, you should have formatted disk ready for the Amiga internal drive.

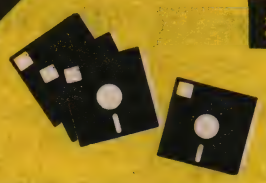
You may also download files to the screen or printer, of course, and it should be noted that downloading parameters can also be part of an automatic script file. If you frequently call Dow-Jones to see how IBM stock is doing, the parameters for downloading to printer or disk could be a part of the script file that logs you

continued on page 180

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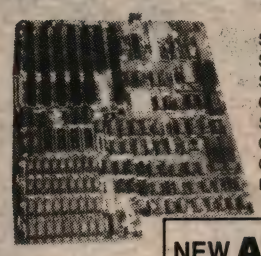
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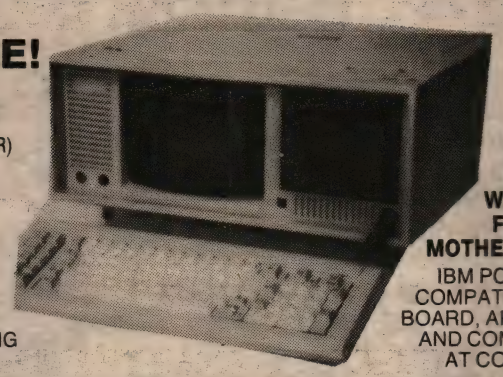
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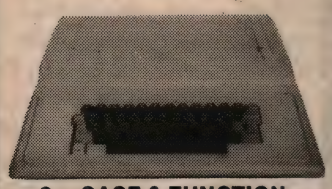
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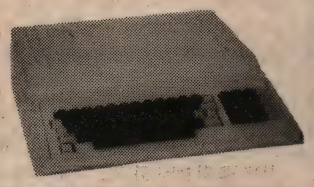


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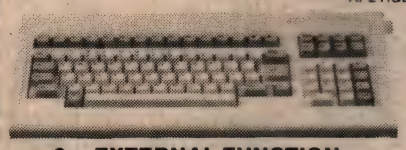
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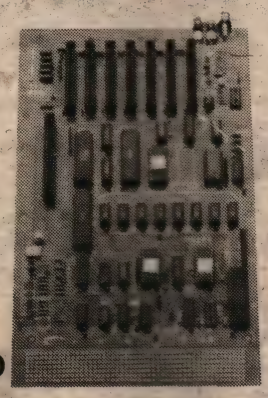


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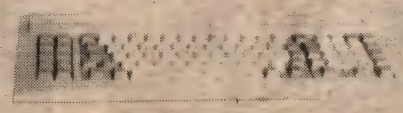
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Parallel Printer Driver continued from page 175

supported when running PPD. Since the User Port is tied up with the Parallel Printer anyway, this should make no difference in most programs. If you try to run a typical communications program, however, expect a "crash" if PPD has been installed first.

Customizing PPD

PPD was written so that user configuration and customization is possible. Customizing PPD isn't necessarily easy for the novice user, but it can be done. On registered versions of PPD ordered on disk, I intend to include a BASIC customization program to automate this process.

You may select any of the operating modes (or combinations) and permanently configure PPD for that mode. Provision has also been made for printer initialization strings and other features. You may also re-define the PPD device number, as in earlier versions.

The customization is done by POKEing one of PPD's internal registers with the proper values. Table 3 is a summary of the internal register that you can modify. They are listed as "offsets" of the starting address.

To POKE the correct register, you will have to find the start address (printed on sign-on) and calculate the final address of the appropriate register using the offset. POKEing the registers can be done either in BASIC or using an ML monitor. To enable a feature, POKE it with a 255 ($FF) to turn it on, or disable it by POKEing it with a zero. Whenever you set up a custom configuration, be sure to lock it in by POKEing the lock flag (LKFLAG) with an $FF. Otherwise, the next OPEN statement sent to PPD will erase your custom version.

Shareware License

PPD is copyrighted. Even though the program is Shareware, and can be freely copied, there are still some limitations. In order to protect the quality of the distribution of the program and to support future development, copying is subject to certain limitations.

Users of PPD are granted a limited license to make copies of this program for trial use by others on a private non-commercial basis. This limited license does not include:

1) Distributing the program commercially in connection with any other product or service.

2) Distributing the program as part of an internal corporate or institutionally sponsored distribution, without written permission from author.

3) Making the program available for any consideration or "disk fee." (This right is explicitly retained by the author.)

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6) Any and all other commercial exploitation of the program, and its proprietary routines, is expressly reserved and forbidden.

The shareware concept is based on three principles:

1. People should be able to try programs to see if they are useful before they buy them.

2. Software authors can better benefit by direct support from their program's users.

3. Copying and networking of programs should be encouraged.

Registration

Registration has several benefits to both the author and end users. Specific benefits of registration are:

* You will receive a disk with the most recent version of the program. This disk will include several additional files that enhance PPD's performance and will be updated periodically.

* You will be able to upgrade to the next highest version (when available) for a nominal postage and handling fee.

continued on page 179



Parallel Printer Driver continued from page 178

* You will be eligible for software support for PPD. Any problems you have with PPD (or suggested mods and improvements) will be responded to quickly.

* You will be supporting the concept that produced PPD in the first place.

Paper Listings And Other Versions of PPD

Only registered users of PPD 3.0 will be able to obtain the assembler source code listing (if and when it is made available). The assembler listing will be included on the PPD disk, when it is released.

For those who would like a paper listing of this BASIC loader version of PPD, send $2.00, and a number 10 "business sized" SASE (self addressed stamped envelope).

Earlier versions of PPD (1.0, 2.0, and 2.2), were introduced in the "Inside Commodore" column of the *Computer Shopper* magazine, in the April and June '85 issues. They are no longer officially "supported" programs, since they have been superseded.

PPD version 2.0, for the VIC-20 is still available, on a non-supported basis, only. To order VIC-20 PPD 2.0 on a 1541 disk, for $7.00.

Some Technical Comments On The PPD Relocator

If you are interested in the technical details of the how and why of the PPD relocation, here's a little more information. Older version of PPD used a BASIC loader that slowly POKEd the printer driver into RAM starting at a fixed location ($C000). The new PPD program contains an integral self-installing, auto-relocating ML loader. Like the old BASIC loader, this also LOADs and RUNs just like any BASIC program, but it initializes much more quickly (about 1 sec. or so).

More importantly, the new loading method allows for dynamic relocation of the ML code to almost anywhere in BASIC RAM. The built-in relocator looks at the "top of BASIC RAM" pointer at locations 55-56 ($37-38). It then moves the PPD code to the RAM area just below that point, does the relocation, adjusts the memory pointer to the start of the program, and protects it from interference by BASIC.

The ability to relocate the driver makes it possible for the PPD to work with software that it might otherwise conflict with due to address space. relocator that comes with

User Port	Centronics Pin	Desc.
M	1	Strobe
C	2	Data 0
D	3	Data 1
E	4	Data 2
F	5	Data 3
H	6	Data 4
J	7	Data 5
K	8	Data 6
L	9	Data 7
B	10	Acknowledge
A,N	19	Ground

(User Port to Centronics Connections)

Since it loads into free BASIC RAM and then protects itself, many utilities that use the $C000-CFFF buffer can also be used with it. This feature also allows the technically competent user to move PPD around in memory without having to re-assemble or "hand relocate" the code. By manipulating the top of memory pointer at 55-56, you can force the relocator to move the PPD code to just about anywhere, including the RAM buffer at $C000.

For real techies, the auto-relocation of the program was made possible by assembling the program with the "RPAL" relocating 6502 assembler (by Brad Templeton) and then appending the "MLOADER" PAL. This system is the easiest way to create auto-relocating programs for C-64 I've seen yet.

Make all checks payable to Ted Drude.

Refer all comments, inquiries, etc. to Ted Drude, P.O. Box F, Titusville, FL 32781.

There is a summary of the supported second addresses and the modes they invoke on page 169. ●

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Math Tutor I
continued from page 80

chine if you decide to order this product, as there are two different versions.

Strictly speaking, drill programs such as Math Tutor, don't really teach, they reinforce to improve accuracy and increase speed. Programs which do this well, get the kids to enjoy running the computer.

Being a bit more advanced in my role as a university professor of mathematics and computer science, I decided that I could not trust myself alone. So, although I did test the package on myself--deliberately making some errors so as to see what kind of opprobrium the program would offer--I also tested it on my five-year old daughter, Melody.

Math Tutor I is designed for use with children in grades 1 to 8 primarily, or for remediation for older children or adults. Thus, strictly speaking, I was pushing the test by using a child two years younger than the earliest year covered. Still, I decided that it could not hurt to try.

To my surprise, Melody not only has been acquiring some arithmetic knowledge of basic addition and even some subtraction, but she was delighted with the program. I had to insist that she let me stop the program. True, I did help her initially by reading the questions, such as, in large letters, "4 + 4 = ?". But after a while I stopped even doing that when I realized that it was quiet unnecessary, and besides, I wasn't giving the machine a fair enough test.

Mostly Cosmetic?

At first thought, it does not seem that such a program as one which tests addition, subtraction, multiplication, and division, ought to be difficult to program. Maybe an hour or so right?

Sure, if you want only a barebones tester...But Roberts wanted to offer many choices: of sound or quite, of black letters against bright background or vice-versa. Color, Input of name, Screen dump of results, as well as scoring for both accuracy and speed. Multiple levels and speed timing for different grades makes the program easy were provided. Easy response without having to hit the Return key and results are summarized for reinforcement.

You get the idea. Now I

continued on page 188

Online!
continued from page 176

on and gives you your password.

Uploading files is as easy. The first method is called "text buffer send" and it is for text files only. Load the file into the capture buffer, then follow the prompts in the pull-down menus.

The second method is called "protocol transfer" for binary files or text files. Protocol transfer sends the file in blocks and will detect errors taking place during the transmission. Protocols supported by Online are XMODEM, XMODEM/CRC and the Hayes Verification Protocol. In addition to these standards, Online also supports the CompuServe service, Online automatically responds to commands sent from CompuServe.

Once you've selected the protocol, select Transmit and a requester will prompt you for a filename and path. A pop-up window appears, showing you the number of blocks in the file as well as estimating the length of time needed for transmission. As with every other feature of Online, we found file transfer extremely easy to use.

Other custom features include a selection of window sizes: 79 columns by 22 lines with frame, 80x23 without the frame; definable macro-key sequences, where one keystroke can enter a commonly used word or phrase; user-definable redials in the event the number you are calling is busy. The number of automatic redials can be set as high as 99 tries. After that, give it up and go to bed.

For those who like to hang out on bulletin boards and chat with the Sysop, a "chat" window is available. Within the window, you can carry on a "CB" type dialog, regardless of incoming data displayed on the primary window.

With its pull-down menus, easy-to-read documentation and requester windows that prompt you through the various routines, we find Online, at its suggested price of $69.95, to be a real value.

Oh, and one other thing. At this writing, the Amiga modem hasn't come to market. In using a Hayes or Hayes-compatible modem, the first thing you'll find is that the serial cable on your dealer's shelf is probably wrong. As they did with the printer cable, Commodore reversed the natural order of things so that what is required for the Amiga-to-Hayes connection is male-to-male, rather than male-to-female.

The Online manual warns against custom cables that are wired straight through and gives you the pin-outs if you wish to have a custom cable made. Failing that, the proper cable can be ordered from Micro-Systems. It may seem a small thing, but we rather like the idea that a company can prove it is really thinking of its customers. ●

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Joysticking
continued from page 79

stores, priced at about two dollars, and sold for cheaper brands of computers. I almost made the mistake of buying one of them. These are switch-type sticks, composed of five momentary-contact switches mounted on a PC board inside a plastic case. The case is nice, but this type of joystick won't do. It can only tell the computer whether the handle is pushed up or down, left or right.

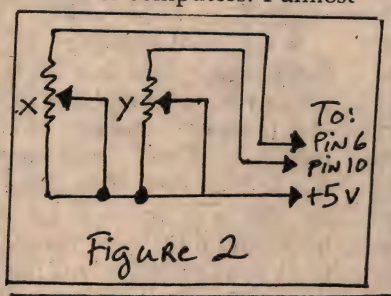


Figure 2

The joystick we need for the Sanyo is built around two pots, or variable resistors. Basically, it's an X,Y positioning input device. Moving the handle will change the resistance of both pots, indicating by proportional resistances the exact position of the joystick. We know not only whether the handle is up or down, right or left, but how much up/down and how much right/left.

Unfortunately, the changing value of resistance varies the voltage level that a joystick output, which is known as the analog form, and which the computer cannot use. Our Sanyo is a digital computer. Therefore, in order to use the joystick, the computer must convert the analog input (voltage level) to digital input. This is called analog-to-digital (A/D) conversion.

When I first bought my Sanyo I was excited about the joystick connector. Wow, I thought, a real analog-to-digital converter, built right into the computer! I began to imagine all sorts of applications. And then I read the description in the Sanyo's operating manual. "Simplified A/D converter," it said. What does that mean—simplified? And what is an A/D converter that isn't simplified? The answers to these questions, as usual, are not so simple.

Typically, your ordinary, not-so-simple A/D converter is a dedicated IC, with built-in analog-to-digital conversion circuitry. This IC samples an input voltage. It then compares the voltage with a reference voltage, and outputs the value of the difference in the digital form required by the computer. This is the hardware approach. It's faster, and requires very little software. You merely read the appropriate input port, and you have your analog-to-digital data.

The Sanyo computer has a different, cheaper, though not uncommon method. The design uses a combination of hardware and software.

First, the hardware. Instead of a dedicated A/D converter, the 55x has a pair of dual retriggerable monostable

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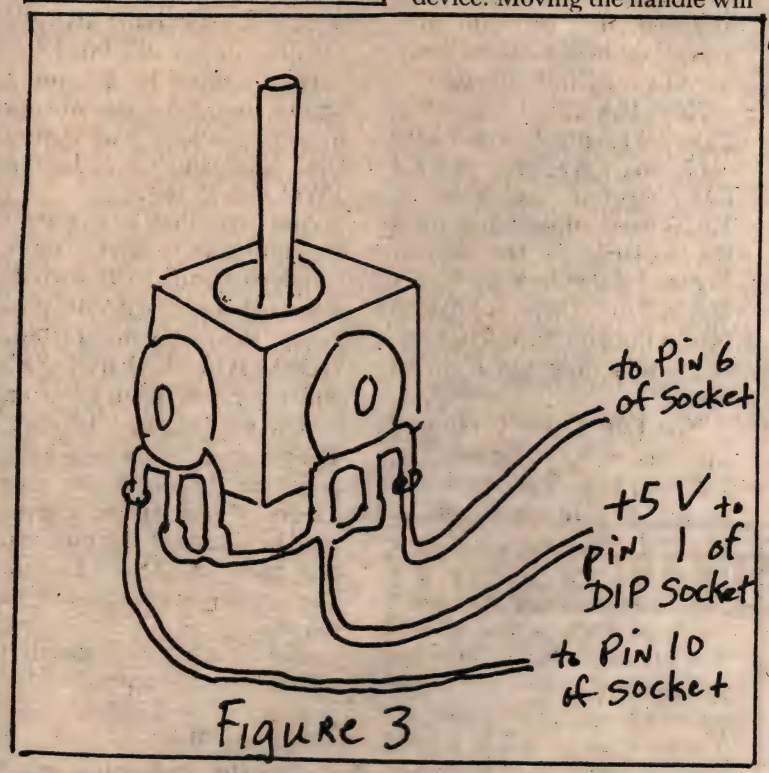


Figure 3

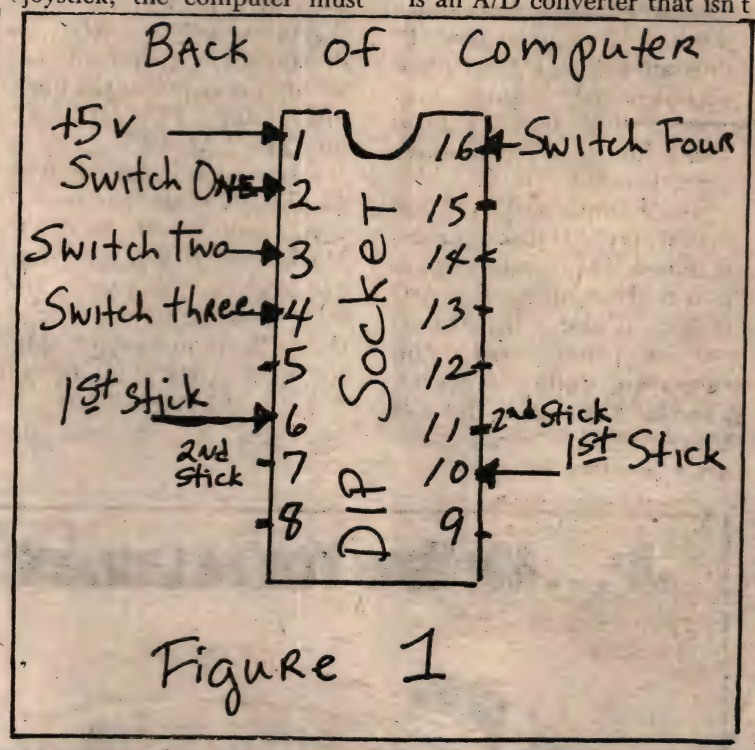


Figure 1

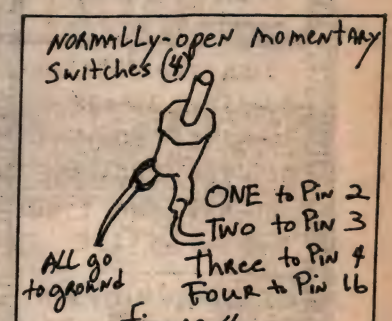
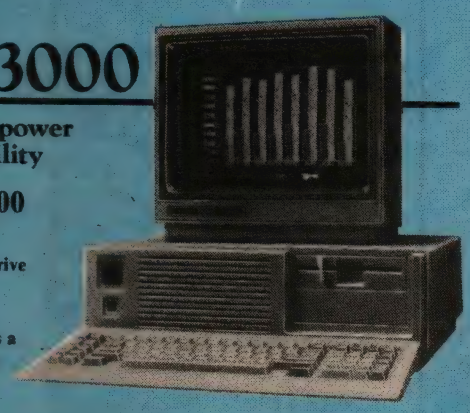


Figure 4

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Joysticking continued from page 181

multivibrators, 74LS123s (a.k.a. one-shots.) What good is a one-shot, you ask. Well, the one-shot will, when triggered, generate an output pulse. And the duration of this pulse can be controlled by a variable resistor. You guessed it. By one of the pots on the joystick.

This isn't all, however. We still need to measure the length of the pulse. That's where the software comes in. An example would help us understand. In Program Listing 1, I've included an assembly language program to show how it's done. This is for one of the joystick's potentiometers.

You'll notice, in lines 2 and 3, that port 1AH (hexadecimal) is zeroed. This is necessary, as port 1AH contains the A/D trigger. It also is the Sanyo's parallel printer port. This causes no conflict, however, since bit 7 is used as the A/D trigger and no printer character uses that bit.

In line 4, bit 7 of port 1AH is loaded, and line 5 fires the A/D trigger. Line 6 is important for timing; the "MUL AL" instruction here serves as a delay. Now the one-shot outputs a single pulse, and line 7 begins the count. Lines 8 and 9 test the joystick port, to see if the pulse is still high. If it is line 10 loops back to continue the count.

When the bit is 0 or low, the count concludes. And we have the loop counts in the CX register. This number represents, in digital form, the position of one potentiometer. To find the second potentiometer, we need only repeat the lines, substituting "TEST AL, 20" for "TEST AL,10."

I know you're saying, why all this program business? I don't really need it, do I? Maybe not. If you need only one joystick, you won't. The folks at Sanyo have provided the software in Sanyo BASIC for one joystick. Line 620 of Program Listing 3 illustrates how easy it is to read the inputs.

But suppose you want to add the second joystick? In that case you would have to do a little programming yourself.

In Program Listing 2, I've shown how the second joystick can be added to BASIC. Notice I've used hexadecimal in the program--it's easier to debug. You might prefer decimal. Keep in mind that you have to CALL each time you read the joysticks; you only need to poke the machine code into memory once. Also, I haven't bothered to check if a second joystick is attached. If it isn't, the program continues to loop. You'll have to reset in that case.

Now, let's wire that joystick. Take the length of 8-conductor cable you have, and solder a DIP jumper and socket onto it. You'll need either wires from the joystick to the Sanyo. Figure 1 shows how the socket is wired up. There are sixteen connections on the DIP socket, but you'll only use eight of them.

The DIP socket is plugged into the empty socket between U95 and U96. The +5 V and switch FOUR input will be toward the back of the computer.

If you've wired the barebones joystick, it should look like Figure 2. Notice how the +5 V wire is soldered to the wiper of each potentiometer. Then the same +5 V is connected to the sides of both pots. We won't need the ground wire for the pots. Figure 3 is another illustration of how to wire the joystick's potentiometers. That +5 V should run to pin 1 of the DIP socket. Use your ohmmeter to check it.

Figure 4 shows how the four momentary button switches should be wired. One side of each switch is connected to our ground wire, and the other to one of the inputs on the DIP socket. While the switch is open, the input will be high or 1. When the button is pressed, the input will go low or 0. That's the opposite of what you normally think should happen, and it takes getting used to. Using the ohmmeter again, make sure the switches are connected to pins 2, 3, 4, and 16.

Now you'll need a box. You'll want, more than likely, all four buttons and the joystick in some kind of enclosure. I discovered the plastic cases that hold those voltage adapters, the ones for small calculators and toys, work perfectly. If you're like me, you have several of these lying around. Finally you should label the buttons some way. I found I had to, because I was always forgetting which was button ONE and which was button TWO and so forth.

And now that you've constructed your joystick, you're wondering what to do with it. I've written a little BASIC program to get you started. "JOYSTICK EXERCISER" will offer you some hints on how to use your new joystick. The program begins by placing a dot in the center of your screen. When you've grown tired of staring at this dot, you can press the ONE button. That will cause the dot to move.

The direction and speed of movement will depend on the position of the joystick.

Pressing the TWO button marks the beginning of a straight line. Then squeeze the ONE button, moving the dot along again. Finally press the FOUR button, and the line will be drawn.

When we want to draw a circle we need the vertical and horizontal radius. First, by pressing the THREE button we mark the center of the circle. Then we move the dot up or down, press the TWO button, and mark the vertical radius. Finally we move left or

continued on page 184

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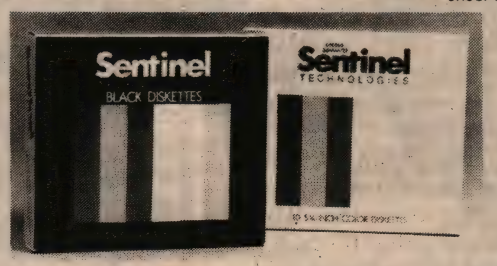
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DATANAMICS

The Silver Box
continued from page 79

low state, or more than about 2.2V for the high state. Exception to this rule are open input pins of the TTL circuits or damaged inputs or outputs. If the input pins are not connected anywhere in the circuit, the open voltage should be about 1.2 to 1.5 volts depending on what meter you are using and the make of the ICs.

If you find a pin which shows, say, 1.4 volts and you want to identify if this pin is connected to a damaged output or this is an open input, you can check it by the amount of current you can draw from this pin to the ground using a multi-meter in the 20MA to 30MA range. The LSTTL inputs normally have 0.15 to 0.2 milli-ampere input current going to the ground if you pull the input pin low. This is what happens if you connect a multimeter in 20MA to 30MA current range to this pin and measure the current.

One word of caution here, is to make sure which pins you are measuring and touch lightly. If you touch a wrong pin and if over-range condition is indicated on your meter, you should remove the meter probe quickly before causing damage to your meter.

If it happens to be a pin connected to a damaged output, your meter probably show current drain of 5 milli-amperes or more, or perhaps a magnitude of current beyond the range of the meter you are using. The multi-meters are usually designed to take a five time over-load without damage for a short-time. But a disaster can hit your meter if you shorted some lines carrying high voltage with your probes when the meter is in milli-ampere current range.

In analog meters, the voltage drop within a meter set at 20 to 25MA range is usually 150MV. (In some digital meters it is 200MV and in some it could be 75MV.) From this you can calculate the internal resistance of your meter in, say, 25MA range, 150MV/25MA = 6 ohms. If you inadvertently touch +12V line with your probes, 12V/6 ohms = 2A, that is about 80 times the full-scale of your meter flows into the meter. This much current often burns out the current multiplier resistor inside the multi-meter in less than a second and then, if it is an analog type, the coil and coil springs in your meter can be scorched and melted with a whif of smoke. Similar damage may happen to a digital type multi-meter as well, if it is not

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PROGRAM LISTING THREE "JOYSTICK EXERCISER"

```
10 CLS:LOCATE 1,1,0
20 DEFINT A-Z
30 '**** START AT CENTER OF SCREEN ****
40 X1=320:Y1=100
50 '**** GET INPUT, XOR RESULT, THEN JUMP ******
60 PSET(X1,Y1)
70 A=INP(24) XOR 207:ON A GOTO 100,130,70,270
80 GOTO 70
90 '***** BUTTON 1 MOVES DOT **********
100 GOSUB 620
110 PRESET(X2,Y2)
120 GOTO 60
130 '***** BUTTON 2 DRAWS A LINE ********
140 LOCATE 1,1,0: PRINT "LINE--";
150 D1=X1:D2=Y1
160 PSET(D1,D2): PSET(X1,Y1)
170 A=INP(24) XOR 207
180 IF A=1 GOTO 210
190 IF A=8 GOTO 250
200 GOTO 170
210 GOSUB 620
220 PRESET(X2,Y2)
230 GOTO 160
240 ' now press button four and draw the line
250 LINE(X1,Y1)-(D1,D2)
260 LOCATE 1,1,0: PRINT "      ";: GOTO 60
270 '***** BUTTON 3 DRAWS A CIRCLE *********
280 ' find vertical point and press button 2
290 LOCATE 1,1,0: PRINT "VERTICAL";
300 C1=X1:C2=Y1
310 PSET(C1,C2): PSET(X1,Y1)
320 A=INP(24) XOR 207
330 IF A=1 GOTO 360
340 IF A=2 GOTO 390
350 GOTO 320
360 GOSUB 620
370 PRESET(X2,Y2)
380 GOTO 310
390 IF Y1>C2 THEN CR2=Y1-C2
400 IF Y1<C2 THEN CR2=C2-Y2
410 ' find horizontal radius
420 LOCATE 1,1,0: PRINT "HORIZONTAL";
430 C3=X1:C4=Y1
440 PSET(C3,C4): PSET(X1,Y1)
450 A=INP(24) XOR 207
460 IF A=1 GOTO 490
470 IF A=8 GOTO 520
480 GOTO 450
490 GOSUB 620
500 PRESET(X2,Y2)
510 GOTO 440
```

Program 3 continued

```
520 IF X1>C1 THEN CR1=X1-C1
530 IF X1<C1 THEN CR1=C1-X1
540 ' now press button 4 and draw the circle
550 RATIO!=CR2/CR1
560 IF RATIO!>1 THEN CR1=CR1*RATIO!
570 PRESET(X1,Y1):PRESET(C3,C4)
580 CIRCLE(C1,C2),CR1,,,,RATIO!
590 X1=C1:Y1=C2
600 LOCATE 1,1,0: PRINT "          ";: GOTO 60
610 '********* joystick subroutine ************
620 X=STICK(1):Y=STICK(2)
630 X=(X-64)/10: Y=(Y-64)/32
640 X2=X1:Y2=Y1:X1=X1+X:Y1=Y1+Y
650 IF X1<0 THEN X1=0
660 IF X1>639 THEN X1=639
670 IF Y1<0 THEN Y1=0
680 IF Y1>199 THEN Y1=199
690 RETURN
```

Joysticking
continued from page 182

right, press the FOUR button, and the circle is drawn.

You should notice that button FOUR is used to draw both the line and the circle. Button ONE is used only to move the dot.

For those interested in further explanation, line 70 checks the input for the four momentary switches. The result is XORed, because the results are inverted. If the switch is on, the bit is zero. If the switch is off the bit is one. XORing simply makes it easier to work with.

Lines 550 and 560 find the ratio for our circle. If you don't understand why I needed line 560, you should read pages 3-109 and 3-110 of the *Sanyo Operator's Guide*. You'll find a pretty good explanation there.

Line 620 reads the X and Y axis of the joystick. Line 630 scales it down, so that the joystick doesn't move too rapidly across the screen. ●

PROGRAM LISTING ONE

```
1           MOV CX,0        ; the counter is zeroed, to empty it
2           MOV AL,0        ; the A/D trigger bit
3           OUT 1A,AL       ; is zeroed
4           MOV AL,80       ; now, load A/D trigger-bit and
5           OUT 1A,AL       ; fire A/D trigger
6           MUL AL          ; pause a while, then go on
7  AGAIN    INC CX          ; increase counter by one
8           IN AL,18        ; input joystick port for testing
9           TEST AL,10      ; test bit 4, first joystick potentiometer
10          JNZ AGAIN       ; if not zero, continue counting
11          DEC CX          ; decrease by one, and we have value in CX
```

PROGRAM LISTING TWO

```
5 '****  POKE INTO MEMORY WHEN PROGRAM BEGINS ****
10 FOR X=0 TO &H36
20 READ A: POKE(X),A
30 NEXT
35 '**** CALL EACH TIME TO READ JOYSTICK ****
40 CALL 0
50 X=PEEK(&H37):Y=PEEK(&H39)
60 PRINT X;:PRINT Y
70 GOTO 40
75 '**** MACHINE CODE FOR READING SECOND JOYSTICK ****
80 DATA &H51,&HB9,0,0,&HB0,0,&HE6,&H1A,&HB0,&H80,&HE6,&H1A,&HF6,&HE0
90 DATA &H41,&HE4,&H18,&HA8,&H40,&H75,&HF9,&H49
100 DATA &H2E,&H89,&HE,&H37,0
110 DATA &HB9,0,0,&HB0,0,&HE6,&H1A,&HB0,&H80,&HE6,&H1A,&HF6,&HE0
120 DATA &H41,&HE4,&H18,&HA8,&H80,&H75,&HF9,&H49
130 DATA &H2E,&H89,&HE,&H39,0,&H59,&HCB
```

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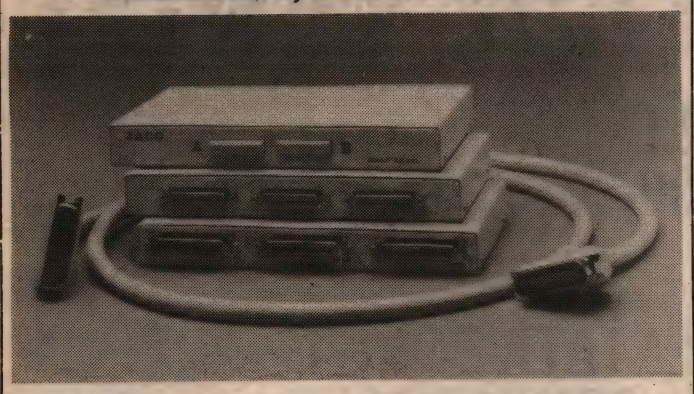
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The Silver Box
continued from page 183

protected with a fuse.

It took me about half an hour of testing to check all the pins on the board and I could not find any bad TTL ICs.

Further Testing Necessary

As the test did not turn up any bad LSTTLs, I put back the Missing Link on top of the main board, for perhaps the twentieth time. But, the result was the same. It hangs when it comes to installing the clock driver, MLCLK.SYS. If CONFIG.SYS was eliminated, it boots up fine if the RAM connection has been unplugged. If the RAM section was connected it goes wild. I thought, this might have connection with the IBMCLOK signal line or the READY line.

To verify my guess, I must drag out my triggerscope and scatter the boards and disk drives on my desk. In order to perform this check efficiently, I would need the circuit schematic. I can spend a day or two to trace the whole circuits but that is inefficient. I want to do it in a short time, otherwise you may never see this column. I phoned the Tampa Bay group and asked for a schematic. The answer was flat "No," but Bob Soltau was kind enough to promise me a new board to be sent the next day.

The board came in the next day by Federal Express. It worked fine except the Real Time Clock. After a few minutes of conversation over the phone, Saltau concluded that the Speed Board is causing the problem. He declared a V20 C.R.U. would cure the problem, something which I do not have at the moment. Since V20 is causing some timing problems, mostly in the area of disk interface, I am planning to dedicate one whole article to it. But, I do not have the real thing yet. In any case, you need V20 in the Speed Board to access the Real Time Clock. The 768K RAM worked fine.

It is significant to state that I received only two makes of memory expansion boards for evaluation. They are the Tampa Bay's "Missing Link" and the Sanyo's VB512, the color board with 256K on it. As I mentioned above, the "Missing Link" is a highly desirable board if you already own the VB550 already, with one inconvenience. You have to pull out the 62 pin socket from the VB550 and install a new, shorter 62 pin socket. The operation is on the easy side if you destroy the old socket and pull out pins one by one with a soldering iron. But if you did not perform any soldering on a board, this might be a formidable task. Soltau suggested to use a suction desoldering iron to remove the solder on the pins. I have several desoldering irons and suction apparatus but their operation is not the easiest thing in the world.

Of the two memory expansion boards received for evaluation, both have merits of their own and I have experienced some troubles with both of them due to the addition of the Speed Board. One is supposedly a quality control problem (and timing problem with the Speed Board) and the other is another timing (design?) problem limiting the RAM expansion to 512K.

The Missing Link board will give you the better cost performance ratio next to piggy back RAMs if you already have the VB550, Sanyo color board, and if you don't mind a little soldering work to replace the connector on the VB550. It will give you 768K and a precious consistency to your files, by stamping an accurate date-stamp on all files. Although the first board sent for evaluation showed some problems, the board design is very smartly done with many features, such as an extra row of pins and the extra Interrupt Controller on board for further expansion using perhaps another innovative expansion board. If you have VB550 and intend to use it, this board is for you. It should not be too difficult to find somebody who will change the socket on the VB550 for you at the right price, in case you shun the task.

The board is available for $199.95 from: Tampa Bay Digital, 1807 Gulf-To-Bay Blvd., Clearwater, FL 33516; (813) 443-7049.

More About The VB512

I have been using the VB512 for the period of about 8 weeks now and some new facts came to light, thanks to Jack Farrow of Plymouth, Michigan and others. The board has been working fine as far as I am concerned. It speeded up my word processing programs tremendously with a RAM disk of 220K capacity, the minimum size without hampering the top speed operation of word processing and spell checking programs. The board can give you 512K total RAM. As long as I don't want to use it differently from the present set up, I have absolutely no complaints. However, the future buyer of this board should be aware of a few peculiar quirks.

The first of the quirks is that you can put only one row of the 256K RAMs without a little modification I call Farrow-Mod (more details later, it still needs some work). Without some kind of solution, the two rows of RAMs collide each other and THE computer does not function, it either hangs or dies. This means that, with the Farrow-Mod you might get the full 640K (or 768K) RAM.

The second of the quirks concerns graphic screen of the original Sanyo display system which remains useful even

continued on page 188

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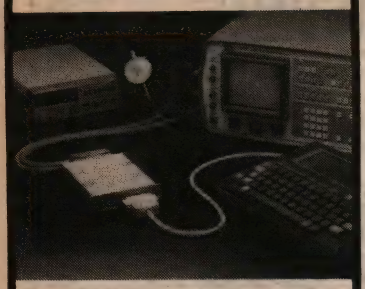
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Math Tutor I
continued from page 180

could see where such a program could wind up consuming over 1300 lines of code (I counted myself out of curiosity and the List took a very L-O-N-G time, believe me!).

Not only do you get bells and whistles, large characters, encouraging feedback, but even the manual is nicely done. At 50 pages, Roberts could have economized and used maybe a couple of pages, and still I would have only good things to say. But just to make sure, he has added everything, including how to backup the non-copy-protected disk. The manual itself is attractive and literate, although I did find an obvious error of spelling and an obvious error of grammar on the inside cover page. Fortunately, these were the only such problems I spotted.

Actual Operation

The program comes on a data disk with an Autoexec.Bat (batch) file. You transfer it and the other three files to another data disk, or to a system disk. If you're going to use it often, do as suggested and transfer to a system disk with BASIC so as to have automatic loading of the program.

After entering BASIC, you get nice opening graphics which are a harbinger of the pleasantries to come. Nice use of Sanyo BASIC's unique Symbol command and other goodies make for an attractive display.

I dwell on the appearance and the user-friendliness for a simple reason: Without them, such programs could be a dime a dozen. What distinguishes this one is the care taken to think everything through. How many programs even come equipped with a special screen-dump utility for the Sanyo and many printers, all built in?

After answering the opening questions so as to have the display and the grade level you prefer, there is a practice question, and then you're off. As soon as the questions begin, your responses are noted, and a running record is kept to give feedback as to accuracy and speed, plus a rating. Mr. Roberts deserves credit for his special disclaimer even here about being cautious as to how to interpret the results. After all, there are many variables involved here, and it would be presumptuous for a program, no matter how good, to attempt to give definitive scoring or rating.

The program proceeds to offer arithmetic questions of a level suited to the grade level you select. Correct and timely responses get positive reinforcement. However, some of the messages are a bit inappropriate, although perhaps humorous: "Capital, Melody" was one of the encouraging messages my daughter got. Assuming that a seven-year old can even read this in time, will he or she know what "capital" means in this context? Does a seven-year old really understand "totally awesome?" What about "wunderbar?" Or is an adult supposed to stand nearby to read and explain these?

In each case, in responding, you simply punch the number and get quick feedback. An opprobrious beep greeted us when an incorrect answer was offered. I'd suggest turning off the sound in a classroom. Or, at least get a hold of one of the public domain or commercial programs which control the awful honker. (For instance, see my review of Michigan Software's Speed Screen in the *Computer Shopper* two months ago. That product includes a "set bell" program.)

Summary

The only thing I found of concern was the level. I thought that the questions for graduates (of eighth grade) were too easy. Perhaps I pushed the wrong key for my choice, but I never got a long division or long multiplication, as shown in the manual.

On the other hand, even if this were so, today's kids need this extra help at any level. Calculators and other problems have really done wonders to destroy the ability to calculate mentally. It is ironic that a computer might help to rectify that imbalance!

As I said before, I personally find it difficult to get excited, as a professional mathematician, about arithmetic drills. I'm more concerned about problem solving and critical thinking at a much higher level.

But, as a software reviewer and software developer who recognizes the need for this product, I feel that this program distinguishes itself by its little extras--lots of them. They are what make the meritorious of review. Couple that with the reasonable price for all the programming involved, and the program earns my recommendation if you have kids who could use the drill. If they enjoy it as much as Melody and Danny, then they'll use it, and thus learn.

Math Tutor I for 192K Sanyo 550 or 555, separate version for IBM or compatibles. DDR Software Associates, 8134 Crystal Creek Road, Sagamore Hills, OH 44067; (216) 467-4587. $29.95 introductory special price until June 1, 1986; $39.95 thereafter. ●

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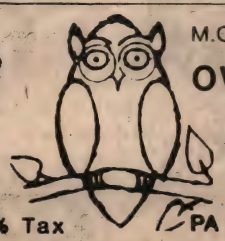
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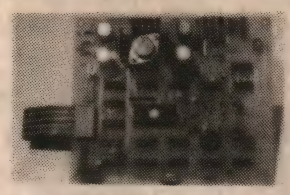


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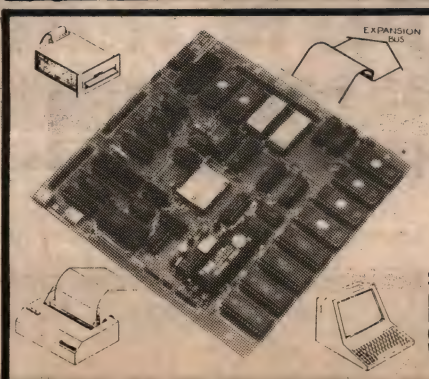
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The Silver Box
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after the installation of this board. However, when you install the VB512 board, some intricate graphic display gliches may show up as some streaks or marks. This is not a software problem but I assume a little modification in the graphic software may overcome this defect which I assume is caused by a subtle hardware timing. If you want to see this hardware bug, try the Michtron's "Cards" game program written in the Sanyo BASIC after installing this board. (I did put the Farrow-Mod in my board but the computer will not boot with the modified board at the

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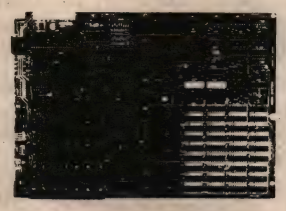
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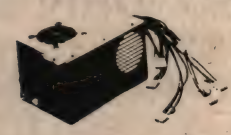
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The Silver Box
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time of this writing, however, quite possibly this quirk may disappear after the mod if I could straighten out the problems.)

The third quirk is not related to the timing problem mentioned above. The board uses CAS (Column Address Strobe) before RAS (Row Address Strobe) type of reflesh. As you all know, the dynamic RAMs need to reflesh the memory contents once every 2 milli-seconds to 12 milli-seconds depending on the performance of the RAM and the operating temperature. The use of this reflesh design means if the RAM is not specified for this type of reflesh mode, these RAMs will not function on this board.

I do not know for sure, because I am too lazy to check the data books and because I am not in the profession of being an engineer for sometime. However I was told by Farrow that the NEC UPD41256 is not this type. I use nothing but the Hitachi HM50256P-15 because this make is all I have, and I was not aware of this problem until he told me about this. You should use Hitachi HM50256 or Mitubishi M5M4256 but not NEC nor OKI RAMs, I was told. The preference should be Hitachi.

The board comes with *another two* versions of the Sanyo *DOS*! One is for the IBM type screen and one for the Sanyo Screen. I tried the latter, 512K non-[VB] DOS, in a stock Sanyo with only 256K. It worked fine. It is a little too early to declare that this DOS should be used in all occasions (You can't keep too many versions of DOS for a single computer. It is confusing and mixing them up produces unexpected errors which is sometimes not easy to correct) but the removal of 256K max RAM restriction from the BIOS should be welcomed.

In any case, I recommend this board if you do not have VB550 already. As I said before, the 512K total RAM available for this board is just enough for any word processing package and the board quality is truly impeccable.

Another New Comer

Last week I received another type of board for evaluation, the 95 dollar speed-up board from the Michigan Software, which was designed by Jack Farrow. It is small enough to be mounted regardless of which add-ons you already have on your main board.

The board was installed and tried the same day I received it and it worked fine in the stock unit. It speeded up the graphic display by about two fold speed. Then I installed the VB550, the old color board. It worked fine. The scroll and string search routine flies at the over-drive speed. When I reinstalled the VB512 back on the main-board, the trouble started. It worked only in the low speed (the stock speed) mode. At the high gear, it displays a pattern on the screen and then the CPU sinks into the bottomless pit. You cannot stir a thing.

Farrow told me the modification for the VB12 board and faxed me the diagrams and his notes on this mod which corrects the timing problem of the VB512 RAM section. This is the mod I wrote about for the VB512.

I had determined to trouble shoot the RAM selection and reflesh circuit of the VB512 ever since the day I had found the problem. I was planning to do it one of these days when I had a few hours to spend. That could be next month, or more realistically could well be next year. But, thanks to the almighty, his solution I explained already should work with a few fix ups.

I did not want to wait. Hastily I added a 74LS74 on the VB512 and soldered ten wires in accordance with his instructions. The 74LS74 redefines the timing window to put the read and write operations clear out of the reflesh cycle. The mod adds one more gate to the READY signal line which, when activated, suspend the operation of the CPU until released. The added NAND-gate senses the on-board RAM select signal for one clock period only and the output of this gate is ORed with the READY signal generated by the Video Timing Generator U66.

The Installation Of Speed Board

The speed-up board requires four connections to IC pins besides the connections done through the CPU socket to which this board is plugged into. It uses four probes to do the connections but the contacts used in the probes look like they are made of low cost brass material and the tips bend too easily causing dislodgement of probes and intermittent lock-ups of the computer a little too often. The better alternative is to solder the wires directly to the pins, once you are satisfied with the board operation and if you have a pencil tip smoldering iron. Otherwise, the construction of the board is fine and well designed for the purpose.

I was writing with this new board at the high gear with the

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The Silver Box continued from page 190

VB550 and it was incredibly fast. Now I am writing without the color board (which was damaged by frequent board swapping), but still with speed. The disk access by a word processing program is usually much slower than the DOS operation because many checking and comparing actions are taken before a disk-read or disk-write is performed. In addition, each character of the text contains an extra bit to indicate the type, and some formatting characters are thrown in-between the real text characters. These present an enormous over-head to the CPU. Word processing software is the type of application programs which require extensive CPU operations. That is where a speed-up board like Farrow's shows its real value.

When you use this board with an 8088 not certified for 8MHZ operation (when you use the orginal CPU that came with the computer), the CPU may exhibit strange behavior when the chip is thoroughly warmed up, and it may crash or freeze, although most of them should perform well. At the higher speed, the CPU may also become sensitive to the power supply voltage. I'm using it at 4.9 volts power supply voltage which proved to be good for disk operation and speed board. The supply voltage on the 8088 chip measured as 4.8 volts.

It appears that the CPU likes lower voltage at the higher end of operating frequency while the disk controller by Mitsubishi tends to like the higher side of the supply voltage. If you use an ordinary 8088 on the speed board, adjustable 5V power supply is advantageous.

One other addition to this is a heat-sink I put on the top of the plastic 8088. The plastic 8088 tends to heat up more than the ceramic version. I glued a 7/8 by 1 inch aluminum heat-sink for TO-220 transistors, using a very thin layer of GE flowable silicone-rubber adhesive. You must carefully decide the exact position on the CPU package because it may interfere with the edge of the "Missing Link" board.

I recommend this board without hesitation, but you should know that V20-8 (uPD70108) CPU may be required if you are using the other add-on boards, such as the "Missing Link." The only thing I wish to see is a low cost kit of this board for the students and others with limited resources. I want to see most of the existing Sanyos is fitted with this board. One of the worst features of the Sanyo has been the slow display. This board may add a new life to a lot of Sanyos. However, use of V20 may require patches in some programs, such as DISKCOPY, FORMAT, etc. which use software timing loop for wait function.

I may write more about this board if I find more interesting facts about it. Can it be upgraded for still faster speed? How about using the NEC's V20-8 or adapting a 80286 running at 10MHZ? The latter should bring a totally new life to the old slow poke! How about adding a Real Time Clock and ports and memories by adding Taiwan multifunction boards with an adaptor with plenty of RAMs!

The Snug News By Snug

The management of the *Snug News* has been sending me a copy every month, a gesture which delights any column writer. Each month, there were some interesting and hot topics, mixed with very useful information appearing among the pages.

One such information is a combination of patches for the Wordstar in the March issue, titled as "WS Backspace or Delete Fix" by Orrin Iseminger, without explanation how he developed these mod, by himself or by accumulation. Anyhow, the mod works. After loading the WS.COM with DEBUG, change byte contents at 049B(H) to AE(H), 049C to 83, 06E6 to 13, 071C to 07. For further information please contact *Snug*.

One more interesting topic found was a question appeared somewhere in the April issue. He asked, "If the disk life is forty hours, how long a disk can be used (I assume he asked in terms of months and years)?" My reply is, "Many years." The forty hour, or some manufacturers were quoted saying twenty hours, mean the life expectancy of a track in contact with the magnetic head. Since you will be using up to 80 tracks on the disk maximum contact hours could be 3200. In word processing you may have a disk access of ten seconds per each half an hour of use. If the access to the track is at random, 3200 * 3600 / 10 = the Maximum Number of Possible Contacts, 1.152 million contacts. Each contacts represents use of half an hour, then, 1.152 * 0.5 = the Maximum Use Hours, 576,000 hours, the empirically derived theoritical maximum.

The theoritical minimum using minimum number of tracks would look like this. In a word processing operation you have to have at least 20 tracks. Suppose you use 5 tracks most intensely and disregard use of other tracks, then, 5 tracks * 20 hours (the smaller value) = 400 hours. Let's take 20 seconds contact time for each one half hour of

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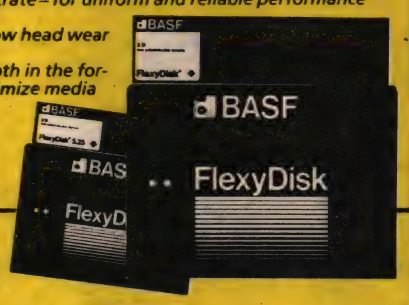
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Data Transfer Protocol Translation Programs

Screen#1:

```
( serial communication constants    TI 99/4A  13JUN85  GED
  based on words from Forth Dimensions VI/2                    )
BASE->R DECIMAL 88 R->BASE CLOAD  STCR
BASE->R HEX
  04D0      CONSTANT  RATE      ( 04D0=300bps 01A1=1200bps     )
   083      CONSTANT  PROTOCOL  ( 8 bits, no parity, 1 stop    )
 01300 2 /  CONSTANT  PORT'     ( 1300=port 1-2 1500=port 3-4  )
PORT' 07 +  CONSTANT  LED       ( LED on RS232 card            )
PORT' 020 + CONSTANT  PORT    DECIMAL ( 020=odd  040=even port)
PORT  13  + CONSTANT  LDIR      ( LoaD Interval Register       )
PORT  16  + CONSTANT  RTSON     ( Request To Send ON           )
PORT  18  + CONSTANT  RIENB     ( Receive Interupt ENaBle      )
PORT  21  + CONSTANT  RBRL      ( Receive Buffer Reg Loaded    )
PORT  22  + CONSTANT  XBRE      ( transmit Buffer Reg Empty    )
PORT  31  + CONSTANT  RESET     ( RESET 9902                   )
R->BASE -->
```

Screen#2:

```
( serial communication primitives   TI 99/4A  13JUN85  GED
  based on words from Forth Dimensions VI/2                    )
BASE->R HEX
: XINIT   RESET SBO          ( reset serial port               )
    PROTOCOL 08 PORT LDCR ( load rate, parity, stop bits       )
    LDIR SBZ                 ( inhibit access to interval reg  )
    RATE 0C PORT  LDCR ;   ( load rcv, xmt rate registers      )
: ?XOUT  XBRE TB ;
: ?XIN   RBRL TB ;
: XOUT   ( char --- )
   LED SBO   RTSON SBO   BEGIN ?XOUT UNTIL
   08 PORT LDCR   RTSON SBZ   LED SBZ ;
: XIN    ( --- char )
  LED SBO  BEGIN ?XIN UNTIL  08 PORT STCR  RIENB SBZ  LED SBZ ;
R->BASE -->
```

Screen#3:

```
( communication protocol primitives TI 99/4A  13JUN85  GED
  based on words from Forth Dimensions VI/2                    )
BASE->R HEX

: TXCLR  0 XOUT ;
: ENQ
   BEGIN

     5  ( enq ) XOUT
     XIN 6  ( ack )  =
   UNTIL ;
: ACK
   BEGIN
     XIN  5  ( enq ) =
   UNTIL
   6  ( ack )  XOUT ;
R->BASE -->
```

Screen#4:

```
( transfer protocols primitives     TI 99/4A  13JUN85  GED
  based on words from Forth Dimensions VI/2 ) BASE->R DECIMAL
: SEND-BLOCK ( block-addr --- )
   DUP  B/BUF +  SWAP
   BEGIN  DUP C@  XOUT 1+  OVER OVER =
   UNTIL  DROP DROP ;
: TAKE-BLOCK ( block-addr --- )
   DUP  B/BUF +  SWAP
   BEGIN  XIN OVER C!  1+  OVER OVER =
   UNTIL  DROP DROP  UPDATE ;
: SYNC  TXCLR
   BEGIN  5 XOUT
          ?XIN  IF  XIN 5 =  ELSE  0  THEN
   UNTIL  6 XOUT
   BEGIN  XIN 6 =  UNTIL ;
R->BASE -->
```

Screen#5:

```
( transfer protocol user lexicons   TI 99/4A  13JUN85  GED
  based on words from Forth Dimensions VI/2 ) BASE->R DECIMAL
: XMT     ( first-scr# last-scr# --- )
   SYNC  1+ SWAP
   DO   ENQ  2 XOUT  I BLOCK SEND-BLOCK
   LOOP ENQ 4 ( eot ) XOUT ;
: RCV     ( first-scr# --- )
   SYNC
   BEGIN DUP BLOCK  ACK  XIN 2 ( stx ) OVER =
         IF   DROP TAKE-BLOCK  0
         ELSE 4 ( eot ) =
              IF   DROP FLUSH
              THEN 1
         THEN SWAP 1+ SWAP
   UNTIL DROP ;
R->BASE -->
```

Screen#6:

```
( TI 99/4A terminal emulator                  28JUN85 GED   )
BASE->R HEX

: TERMINAL XINIT
   BEGIN
     ?XIN  IF  XIN EMIT  ENDIF
     ?KEY -DUP IF
                 DUP 2 =  IF  QUIT   ENDIF
                 0837C C@ 020  AND
                   IF  XOUT  ELSE  DROP  ENDIF
                 ENDIF
   AGAIN ;
R->BASE
```

Fourth Floating Point Fixes Programs

SCR#45:

```
( FLOATING POINT <4 WORD> CODE STACK ROUTINES  20APR85 GED )
0 CLOAD PI   BASE->R DECIMAL 33 R->BASE   CLOAD RANDOMIZE
BASE->R DECIMAL 74 R->BASE   CLOAD ;CODE   BASE->R HEX
CODE FDUP   C009 , 0229 , FFF8 , C049 , CC70 , CC70 ,
            CC70 , C450 , 045F ,
CODE FDROP  0229 , 0008 , 045F ,
CODE FOVER  0229 , FFF8 , C049 , C001 , 0220 , 0010 ,
            CC70 , CC70 , C450 , 045F ,
CODE FSWAP  C009 , C070 , C0B0 , C0F0 , C130 , C670 ,
            CA70 , 0002 , CA70 , 0004 , CA50 , 0006 ,
            0220 , FFFA , CC01 , CC02 , CC03 , C404 , 045F ,
CODE F!     C039 , CC39 , CC39 , CC39 , C439 , 045F ,
CODE F@     C019 , 0229 , FFFA , C049 , CC70 , CC70 ,
            CC70 , C450 , 045F ,
834A CONSTANT FAC  835C CONSTANT ARG
R->BASE -->
```

SCR#46:

```
( FLOATING POINT ARITHMETIC ROUTINES 12JUL82-LCT 26APR85-GED )
BASE->R HEX
: >FAC FAC F! ;
: >ARG ARG F! ;
: FAC  >FAC F@ ;
: SETFL  >FAC >ARG ;
: F+   SETFL 0600 XMLLNK FAC> ;
: F-   SETFL 0700 XMLLNK FAC> ;
: F*   SETFL 0800 XMLLNK FAC> ;
: F/   SETFL 0900 XMLLNK FAC> ;
: S->FAC   FAC ! 2300 XMLLNK ;
: FAC->S   1200 XMLLNK FAC @ ;
: FAC>ARG  FAC ARG 4 MOVE ;
: F->S >FAC FAC->S ;          : S->F S->FAC FAC> ; DECIMAL
: FRND 3 0 DO 100 RND 100 RND 256 * + LOOP
  100 RND 16128 + ;                          R->BASE -->
```

SCR#48:

```
( FLOATING POINT - COMPILE NO TO STACK 12JUL82 LCT) BASE->R HEX

: F$   PAD 1+ SWAP >R R CMOVE R> PAD C! VAL FAC> ;
( Compile No to stack at compile time  12MAR86 GED )
: >F   BL WORD HERE COUNT  F$
    STATE @   IF  >R >R [COMPILE] DLITERAL
                  R> R> [COMPILE] DLITERAL
              ENDIF ; IMMEDIATE

( FLOATING POINT OUTPUT ROUTINES )
: JST   PAD C@ - SPACES PAD COUNT TYPE ;
: F.R   >R >FAC STR R> JST ;
: F.    0 F.R ;
: FF.R  >R >R >R >FAC R> 0 R> STR. R> JST ;
: FF.   0 FF.R ;
R->BASE -->
```

Flower Power et al in TI Fourth Programs

SCR#90:

```
( transcendental functions                          30JUN84 GED )
: TABLE   ( data type of table                        LJS 1982 )
   <BUILDS DOES> SWAP  DUP + + @ ;
BASE->R DECIMAL
TABLE (SINES)  ( Angle in degrees >=0 AND <=90 --- SINE * 10000)
 0 , 175 , 349 , 523 , 698 , 872 , 1045 , 1219 , 1392 , 1564 ,
1736 , 1908 , 2079 , 2250 , 2419 , 2588 , 2756 , 2924 , 3090 ,
3256 , 3420 , 3584 , 3746 , 3907 , 4067 , 4226 , 4384 , 4540 ,
4695 , 4848 , 5000 , 5150 , 5299 , 5446 , 5592 , 5736 , 5878 ,
6018 , 6157 , 6293 , 6428 , 6561 , 6691 , 6820 , 6947 , 7071 ,
7193 , 7313 , 7431 , 7547 , 7660 , 7771 , 7880 , 7986 , 8090 ,
8191 , 8290 , 8387 , 8480 , 8572 , 8660 , 8747 , 8829 , 8910 ,
8988 , 9063 , 9135 , 9205 , 9272 , 9336 , 9397 , 9455 , 9511 ,
9563 , 9613 , 9659 , 9703 , 9744 , 9781 , 9816 , 9848 , 9877 ,
9903 , 9926 , 9945 , 9962 , 9976 , 9986 , 9994 , 9998 , 10000 ,
R->BASE -->
```

SCR#91:

```
   ( trig functions                                 30JUN84 GED)
BASE->R DECIMAL
: SINES        ( [N<361] --- sine * 10000  )
     DUP 270 > IF 360 SWAP - (SINES) MINUS ELSE DUP 180 >
     IF 180 - (SINES) MINUS ELSE DUP 90 > IF 180 SWAP -
     ENDIF (SINES) ENDIF ENDIF ;
: <SINE        ( n --- [n<360] )
    DUP 0<  IF ( - ) 360 MOD 360 +  ELSE ( + )  360 MOD ENDIF ;
: SINE         ( n --- sine * 10000   )   <SINE SINES ;
: COSINE       ( n --- cosine * 10000 )   90 + SINE ;
: TANGENT      ( n --- tang  )   DUP  SINE SWAP  COSINE / ;
: COTANGENT    ( n --- cotan )   DUP  COSINE SWAP  SINE / ;
: SECANT       ( n --- secant)   SINE 10000 SWAP / ;
: COSECANT     ( n --- cosec )   COSINE 10000 SWAP / ;
R->BASE
```

SCR#92:

```
( a translation from HCM "ONE-LINERS" vol 5 no 3
                                                 06JUL85  GED  )
BASE->R HEX
: CLEAN   ( --- )   2000 1800 0 VFILL ; DECIMAL
: SCALE   ( --- )   10000 */ 110 / ;
```

Program continued on page 194

Program continued from page 193

```
: ?RETURN ( --- )   BEGIN  ?TERMINAL  UNTIL TEXT ;
: ONE-LINER  ( --- )
   GRAPHICS2
1 1 DO  CLEAN
      I 2 MOD  MINUS 180 *  360 +
     0 DO     I J  * COSINE  DUP
              I COSINE  SCALE  128  +
        SWAP  I SINE  SCALE  MINUS  95 SWAP -
        DOT LOOP
    LOOP  ?RETURN ;
R->BASE

SCR#93:

( Double number word set  CODE definitions  05JUL85 GED     )
BASE->R  DECIMAL 74  R->BASE  CLOAD ;CODE
BASE->R HEX

CODE 2!     C039 , CC39 , CC39 , 045F ,
CODE 2@     C019 , C070 , C650 , 0649 , C641 , 045F ,
CODE 2DROP  8E79 , 045F ,
CODE 2DUP   0229 , -4 , CA69 , 6 , 2 , C669 , 4 , 045F ,
CODE 2OVER  0229 , -4 , CA69 , A , 2 , C669 , 8 , 045F ,
CODE 2SWAP  C029 , 2 , C059 , C669 , 4 , CA69 , 6 , 2 ,
            CA40 , 6 , CA41 , 4 , 045F ,
CODE 2ROT   C029 , A , C069 , 8 , C089 , 0222 , 6 , C892 , 4 ,
            0642 , 8242 , 16FB , CA40 , 2 , C641 , 045F ,


R->BASE -->

 SCR#94:

    ( Double number word set cont'
 BASE->R DECIMAL
 : 2CONSTANT  <BUILDS , , DOES> 2@ ;
 : 2VARIABLE  <BUILDS 0. , , DOES> ;
 : D-    DMINUS D+ ;
 : D=    D- 0= SWAP 0= AND ;
 : D0=   0. D= ;
 : D<    D- SWAP DROP 0< ;
 : DU<   ROT SWAP  2DUP  U<  IF  2DROP 2DROP
          ELSE  = IF  U<  ELSE  2DROP 0  ENDIF  ENDIF ;
 : DMAX  2OVER 2OVER  D- SWAP DROP 0<
          IF  2SWAP  ENDIF 2DROP ;
 : DMIN  2OVER 2OVER  2SWAP D-  SWAP DROP 0<
          IF  2SWAP  ENDIF  2DROP ;

 R->BASE
```


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Heath/Zenith-150

continued from page 92

the Color Graphics Adapter (CGA), and the Enhanced Graphics Adapter (EGA). Each display has the following graphic characteristics:

Display	Max Resolution (colors)
Monochrome (MDA)	720 h X 350 v (b&w-text only)
Hercules (Herc)	720 h X 348 v (b&w)
Color (CGA)	640 h X 200 v (b&w)
Enhanced (EGA)	640 h X 350 v (16 colors)

Right now, Zenith makes an MDA compatible video board (the H/Z-329) and a CGA compatible board that's included standard with all machines. (They do not currently market an EGA-compatible card, but there are many available from other third parties.)

Zenith also makes another color card, the H/Z-319. It has higher resolution than the CGA standard (640 x 225 and 8 colors), but not quite as much as the EGA. Unfortunately, it's really only software compatible with the older H/Z-100 video system (which was why it was developed). We are going to concern ourselves primarily with the Zenith's MDA card, CGA card and the how it compares to IBM's CGA and EGA.

Mono Displays

The Zenith Mono card, H/Z-329, functions just like the IBM MDA. It produces a very sharp text display. It requires a special TTL monitor (like IBM's card), the less expensive composite monochrome screen won't work.

Like the IBM card, the only graphics capability the monochrome card has are the extended characters set's "block graphic" characters. No hi-res bit maps are allowed.

On the other hand, for almost the price of the Zenith monochrome card, you can get a "Hercules-type" mono card that include hi-res bit-mapped graphics in addition to sharp text. Hercules was the first company to make this type of "monochrome graphics card" (that's why it's called a "Herc"), but there are now several board makers producing similar versions. The only drawback is that a lot of graphics software is not written to run on it.

Zenith's CGA compatible color card, like IBM's, runs almost all graphic software. In addition to text and lower-res modes, it includes a hi-res (640 x 200) black and white mode. While the horizontal dots are enough, the 200 lines of vertical resolution are a little sparse. Text and graphics often have a "grainy" look on a CGA that the MDA cards don't have. The reasons (and some solutions) for this are a little technical.

The NTSC (National Television Standards Committee) TV display standard, upon which most North American video display systems are based, allows for up to 525 "scan" lines per frame. Since the color cards can normally only produce 200 vertical lines that means less than half of the 525 possible lines are displayed on your monitor. As a result, the 200 lines of the color card, are spaced twice as wide as they could be. You can see the final effect of this if you look closely at text displayed by the color cards. You will notice there are large vertical "gaps" of space between vertical dots in the characters. The same is true in the graphics modes. Careful inspection will show visible spaces between vertical lines.

Increasing Vertical Resolution

You can increase apparent vertical resolution of the video system by increasing the number of vertical scan lines you display. There are several ways of doing this. One way is to increase the size of the "bit-map" from 640 x 200 to something like 640 x 350, or 640 x 380. This is what IBM's Enhanced Graphic Display Adapter (EGA) and some other third party color cards do.

Unfortunately, when you change the screen bit-map, you lose software compatibility with the normal Color Graphics Adapter (CGA). Also, the larger the bit-map, the more memory you have to manipulate in order to move, scroll, or animate images. CGA type graphics.

Higher Scan Rate

Another way is to double the apparent vertical resolution, and still keep compatibility with the CGA, is to double the horizontal "scan rate" video display. This is referred to as a 640 x 400 "non-interlaced" display. Each line on the screen is reproduced twice; once at the "normal" screen position, and then once immediately below it.

Vertical pixels are displayed in double resolution on the screen. The net effect is the "gap" between lines is filled in and the visible resolution is greatly enhanced. The actual bit-map resolution, however, stays exactly the same: 200 lines. So the software side of the adapter is identical. Unfortunately, this requires a special color adapter and a special "high scan rate" monitor, both of which are rather expensive. (But they produce nice results.)

400 Line Interlacing

A third way to achieve the same effect, is to switch to a 400 line "interlaced" video. (I mentioned this last month briefly.) This method is similar to the 400 line "non-interlaced" mode, you output one of two "fields" of 200 line and then later output the same image slightly offset and below the first one. This achieves the same effect as a higher scan rate, by "filling in" the vertical gap. Unlike the other two methods, the scan rate and the bit-map stay the same.

The trade-off is that the video picture is less stable, since it takes twice as long to "build." The net result is a picture that "wiggles" up and down when viewed on a normal monitor. This "wiggling" can be greatly reduced through the use of a "long persistence" phospor monitor. The Zenith CGA cards already have 400 line interlacing built in, you'll just have to check it out on a long peristence monitor for yourself, and decide if it's worth the extra cost. ●

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More Sanyo Software
continued from page 80

tions include the usual notes on making copies and telling how to avoid the flashing on new Sanyos from the factory, as such appears on monchrome. Otherwise, the program itself is self-contained, and deserves no substantially adverse comment. The object is for you to type exactly what you see on the screen, all to be done as accurately and as quickly as possible.

Without going into more detail, I'll just say that the program gives you quite a few choices in terms of the kind of drill you want. It keeps track of you on disk, too. However, I liked best the instantaneous feedback in terms of a little arrow underneath to point out errors, as well as the timer in terms of words per minute. One piece of advice: If you make a mistake, don't try to go back and correct your error, as you really can't, and it will just slow you down to try.

If you're an experienced typist, you might find, as I did, that the little exercises of typing "ff dd as sa dd ff fd df" can be demoralizing since they don't seem to have the feel of real typing. You might wish to stick to the longer words and the paragraphs. These give a more representative feel for typing and they seem to cover the whole keyboard quite well, too.

Most other computers have typing programs for their machines, possibly even public domain ones. I have not seen any other than Type Right for the Sanyo, so if you've been looking for such a tutor, this will do the job. If there are other such programs out there for the Sanyo, would somebody drop me a line to update my information? (Dr. Michael W. Ecker c/o *Computer Shopper*, P.O. Box F, Titusville, FL 32781. Include a SASE if you require any kind of reply.) I'll pass on any such message to readers in a subsequent column, and I'll correct the record, if needed.

Summary

Although I was initially unenthused about the idea of a typing program, I have to admit that Olson's and MichTron's implementation of one for the Sanyo is excellent, aside from the egregious and ironic typos I pointed out before. There are several little extras which I haven't explicity pointed out in terms of color, graphical features, ease of use, etc. These will be obvious upon use, and make this package a fair to very good value for the price: $29.95 plus $3 shipping/handling. If you or a family member could use help with typing on the Sanyo 55x series computer, then I recommend Type Right.

Appointment Calendar

With MichTron's Electronic Appointment Calendar, you can save to disk all those timely dates and reminders. The program operates as a standalone utility, meaning that you explicitly load and use it in the foreground.

Thus, the question of utility comes to mind immediately, and is one of personal preference.

Should a calendar program for reminders be in this form? Whether or not you can justify use of this kind of program depends on how you use your computer, and equally important, your style in organizing your schedule, or how you'd like to. If you turn on your Sanyo everyday, then the answer may well be yes. It also depends on whether and how you are organized (or not) in general. I cannot advise you as to how to be more organized in this review. The question is whether a disk-based reminder system with calendar comfortably fits your needs.

In this regard, I personally would have preferred to see Calendar operate as a memory-resident, background utility. Indeed, MichTron's Corner Man does do that, and more. But, I wish that Appointment Calendar had this pop-up feature while retaining its slightly larger size; Cornerman's is too small for me.

How It Works

The program comes exactly as does Type Right (see review above), so I won't repeat the information. In this case, I created a system disk with a batch file for automatic loading of calendar. Heck, if I were going to use the program I might as well make it easy on

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The Silver Box
continued from page 192

use. Then the theoritical minimum would be 18,000 possible contacts which translate to 9,000 minimum hours. This is still a large value, if you think of "8 hours a day, 365 days a year" amount to only 2,920 hours.

I am not praising the *Snug News* because my name happened to show up in one of their pages, but I buy their effort to be useful to Sanyo owners.

If you are interested contact: Ken Fowles, Box 8683, Moscow, ID 83843; (509) 332-6918.

The Free Protection

The free Marcon Varistor for protection of your computer is still available at the time of this writing. All the readers who have a soldering iron are encouraged to send a SASE with a note requesting the Marcon Varistor, the protector of all electrical equipment.

Regarding use of the varistor, a question has been raised by a reader about the efficiency of putting two more varistors in between the two legs of the power line and the ground. This will give an increased level of protection, but this application requires the 400 volt type rather than the 130 volt type I am offering free.

The Serial Solution

I am getting some, but not overwhelming, poking from our readers to do the articles on Serial Board circuit board and software. I may have to find time and do it if you readers prod me a little more. We need reader interest! We will do whatever you want to see done!

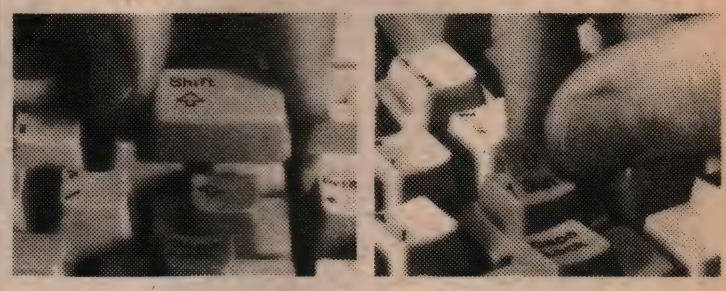
My Turbo Pascal communication software is still not finished. Other priorities have prevailed. But, if there is demand, it should be done.

Due to the limitation of space, QANDA is not appearing this month.

Agenda For The Next Month

You will see the final round up of the three add-on boards, the "Missing Link," the Sanyo "VB512" with or without the proposed modification for speed up and the Michigan Software's Speed Board. In addition, we received a new software this week. It is called "Second Screen Driver," a program which handles the two screens, the IBM compatible and the Sanyo screen at the same time. The Sanyo screen on a separate video monitor will be treated as printer. LPrint in basic will use this screen for output. More details will be reported in next month's column. ●

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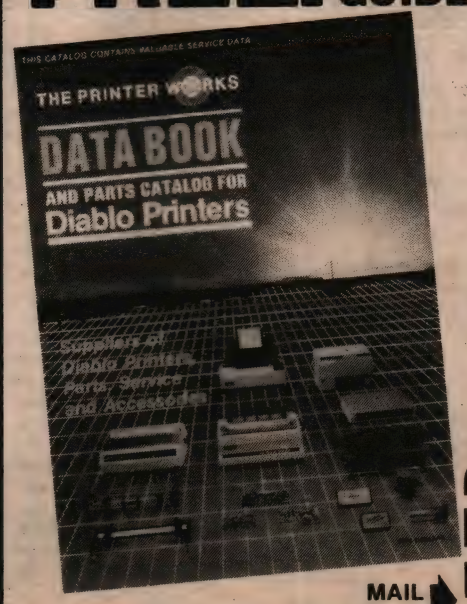
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Budgetmate Program continued from page 76

BUDGETMATE

```
STJ 10 REM BUDGETMATE
KGJ 20 REM COPYRIGHT 1986 JEFF BRENNER
YSJ 30 CYR=1900
UBJ 40 DIM INVERSE$(59),WINDOW$(130),SCR$(960),MENU$(960)
FDJ 50 DIM HEADING$(240),LAST(20),BUDGET(20),ACTUAL(20),LB(20)
VWJ 60 DIM DATE$(15),IN$(100),TEMP$(100),FILE$(20),Z$(1),Z1$(1)
JMJ 70 DIM XP(2):XP(0)=2:XP(1)=23:XP(2)=31
PYJ 80 INVERSE=ADR(INVERSE$):WINDOW=ADR(WINDOW$)
XMJ 90 DIM SP$(100):SP$=CHR$(32):SP$(100)=CHR$(32):SP$(2)=SP$
LCJ 100 DIM D$(2):D$=CHR$(156):D$(2)=CHR$(157)
ACJ 110 GOSUB 3400:GOSUB 700:OPEN #1,4,0,"K:":OPEN #2,9,0,"E:":POKE 559,0
HCJ 120 SETCOLOR 4,9,0:SX=85
IJJ 130 FOR I=704 TO 707:POKE I,0:NEXT I
RXJ 140 RESTORE 160:FOR I=1 TO 59:READ N:TOT=TOT+I+N
BWJ 150 INVERSE$(I,I)=CHR$(N):NEXT I
PEJ 160 DATA 104,104,104,170,165,88,133,208,165,89
OSJ 170 DATA 133,209,104,104,168,240,16,24,165,208
MNJ 180 DATA 105,40,133,208,165,209,105,0,133,209
QRJ 190 DATA 136,208,240,24,138,101,208,133,208,165
ONJ 200 DATA 209,105,0,133,209,104,104,168,136,177
FXJ 210 DATA 208,73,128,145,208,136,16,247,96
THJ 220 RESTORE 240:FOR I=1 TO 130:READ N:TOT=TOT+I+N
YFJ 230 WINDOW$(I,I)=CHR$(N):NEXT I
RGJ 240 DATA 104,104,133,212,104,133,211,104,104,170
PJJ 250 DATA 165,88,133,208,165,89,133,209,104,104
MZJ 260 DATA 168,240,29,24,165,208,105,40,133,208
MOJ 270 DATA 165,209,105,0,133,209,24,165,211,105
MAJ 280 DATA 40,133,211,165,212,105,0,133,212,136
QYJ 290 DATA 208,227,24,138,101,208,133,208,165,209
NUJ 300 DATA 105,0,133,209,138,101,211,133,211,165
NUJ 310 DATA 212,105,0,133,212,104,104,168,136,132
SDJ 320 DATA 213,104,104,170,164,213,177,208,133,214
QRJ 330 DATA 177,211,145,208,165,214,145,211,136,16
OSJ 340 DATA 241,24,165,208,105,40,133,208,165,209
LZJ 350 DATA 105,0,133,209,165,211,105,40,133,211
MHJ 360 DATA 165,212,105,0,133,212,202,208,211,96
GGJ 370 GOSUB 1670:POKE 752,1
UPJ 380 POSITION 4,5:PRINT "INSERT THIS YEAR'S DATA DISKETTE"
HSJ 390 POKE SX,4:PRINT "OR A BLANK, FORMATTED DISK FOR A"
ATJ 400 POKE SX,16:PRINT "NEW YEAR"
KAJ 410 POSITION 3,4:L=34:H=4:GOSUB 2020
BQJ 420 IF TOT<>187386 THEN GOSUB 620
URJ 430 POSITION 9,9:PRINT "PRESS START WHEN READY"
VXJ 440 A=USR(ADR(INVERSE$),9,9,22)
UGJ 450 FOR I=1 TO 20:IF PEEK(53279)=6 THEN 470
UFJ 460 NEXT I:GOTO 440
NTJ 470 TRAP 1700:CLOSE #3:OPEN #3,4,0,"D:HEADING.DAT"
DHJ 480 INPUT #3;YEAR:GOSUB 1670:IF MONTH+DAY<>0 THEN 510
XGJ 490 POSITION 10,4:PRINT CYR+YEAR;" DATA DISKETTE"
LDJ 500 POSITION 9,3:L=21:H=1:GOSUB 2020:GOSUB 1770
BFJ 510 GOSUB 1100:GOSUB 520:GOTO 610
CUJ 520 HEADING$="":FOR I=1 TO 19:INPUT #3;TEMP$
WCJ 530 HEADING$(LEN(HEADING$)+1)=TEMP$:NEXT I:CLOSE #3
KSJ 540 GOSUB 820:POSITION 2,2:PRINT "***INCOME***"
VKJ 550 A=USR(ADR(INVERSE$),2,2,12)
WBJ 560 FOR I=1 TO 19:PRINT HEADING$(I*12-11,I*12):NEXT I
XJJ 570 FOR I=0 TO 19:NUM=LAST(I):POSITION 21-LEN(STR$(NUM)),I+2:PRINT NUM
VTJ 580 NUM=BUDGET(I):POSITION 29-LEN(STR$(NUM)),I+2:PRINT NUM
PGJ 590 NUM=ACTUAL(I):POSITION 37-LEN(STR$(NUM)),I+2:PRINT NUM:NEXT I
XEJ 600 COL=1:GOSUB 2750:COL=2:GOSUB 2750:COL=0:RETURN
UAJ 610 YP=2:GOSUB 1440:GOSUB 2220
TCJ 620 RESTORE 650:FOR I=1536 TO 1616:READ N:TOT=TOT+I+N:POKE I,N:NEXT I
XUJ 630 IF TOT=187386 THEN A=USR(1536):RETURN
ONJ 640 GRAPHICS 0:PRINT "PROGRAM ENTRY ERROR - CHECK DATA LINES":END
SBJ 650 DATA 104,162,6,160,10,169,7,76,92,228,174,132,2,240,5,202
CNJ 660 DATA 134,206,240,40,174,120,2,228,203,208,4,165,206,208,29,165
DWJ 670 DATA 207,240,4,198,207,240,21,230,206,134,203,230,207,173,113,2
ORJ 680 DATA 201,1,240,2,162,16,189,63,6,141,252,2,76,98,228,52
QFJ 690 DATA 24,29,27,15,51,53,48,7,31,30,26,50,34,12,191,14,155
KXJ 700 RESTORE 750:I=0:TOT=0
XBJ 710 READ NUM:IF NUM=-1 THEN 730
QXJ 720 TOT=TOT+NUM+1:POKE 1664+I,NUM:I=I+1:GOTO 710
XXJ 730 IF TOT<>13247 THEN PRINT "ERROR - CHECK LINES 3000-3060":END
POJ 740 FOR I=1767 TO 1790:POKE I,148:NEXT I:A=USR(1664):RETURN
SLJ 750 DATA 104,173,48,2,133,204,173,49,2,133,205,160,26,169,148
TZJ 760 DATA 153,230,6,136,208,250,160,0,177,204,9,128,145,204,160
QUJ 770 DATA 3,177,204,9,128,145,204,160,6,177,204,9,128,145,204
KUJ 780 DATA 200,192,28,208,245,169,197,141,0,2,169,6,141,1,2
QIJ 790 DATA 173,14,212,9,128,141,14,212,96,72,152,72,173,11,212
PLJ 800 DATA 201,7,240,18,201,8,240,14,230,204,164,204,185,231,6
NWJ 810 DATA 141,24,208,104,168,104,64,169,0,133,204,240,238,-1
MFJ 820 GOSUB 1670:DM=PEEK(559):POKE 559,0
TXJ 830 Z$="":IF YEAR<10 THEN Z$="0"
WUJ 840 Z1$="":IF YEAR-(MONTH=1)<10 THEN Z1$="0"
EUJ 850 POSITION 16,0:RESTORE 6500+MONTH-1:READ TEMP$,IN$
YNJ 860 PRINT CHR$(8);TEMP$(1,3);CHR$(32);Z1$;YEAR-(MONTH=1);CHR$(8);
KOJ 870 FOR I=1 TO 2
OVJ 880 PRINT CHR$(136);IN$(1,3);CHR$(32);Z$;YEAR;CHR$(8);:NEXT I
XTJ 890 A=USR(ADR(INVERSE$),17,0,23)
IEJ 900 POSITION 4,1:PRINT "CATEGORY"
VKJ 910 A=USR(ADR(INVERSE$),2,1,13)
ETJ 920 POSITION 1,22:PRINT CHR$(2);"ESC FOR MENU";CHR$(22)
XKJ 930 A=USR(ADR(INVERSE$),2,22,12)
MGJ 940 POSITION 15,1:PRINT CHR$(8);"ACTUAL";CHR$(8);CHR$(136);
VUJ 950 PRINT "BUDGET";CHR$(8);CHR$(136);"ACTUAL";CHR$(8)
XRJ 960 A=USR(ADR(INVERSE$),16,1,23)
WWJ 970 IN$=CHR$(2):IN$(2,13)=SP$:IN$(14)=CHR$(22)
WHJ 980 TEMP$=CHR$(130):TEMP$(2,8)=SP$:TEMP$(7,7)=CHR$(150)
SCJ 990 POSITION 1,1:PRINT CHR$(2):POSITION 14,1:PRINT CHR$(22)
CUJ 1000 FOR I=1 TO 20:POKE 85,1:PRINT IN$;TEMP$;TEMP$;TEMP$:NEXT I
TYJ 1010 FOR X=15 TO 35 STEP 8:POSITION X,22
MQJ 1020 FOR I=1 TO 7:PRINT CHR$(13);:NEXT I:NEXT X
IJJ 1030 A=USR(1664):POKE 1767,144:POKE 1768,144:POKE 1789,144:POKE 1790,144
OCJ 1040 POKE 1769,144:FOR I=1770 TO 1788 STEP 2:POKE I,146:NEXT I
WHJ 1050 POKE 53260,213:POKE 53265,255
OIJ 1060 FOR I=704 TO 706:POKE I,144:NEXT I
MMJ 1070 POKE 53252,104:POKE 53253,136:POKE 53254,168:POKE 53255,200
UWJ 1080 POKE 53248,48:POKE 53261,255
GNJ 1090 POKE 559,DM:RETURN
XHJ 1100 FILE$="D:MONTH":FILE$(LEN(FILE$)+1)=STR$(MONTH)
YIJ 1110 TRAP 1390:CLOSE #4:OPEN #4,4,0,FILE$:INPUT #4;ACTUAL:INPUT #4;BUDGET
DDJ 1120 FOR I=0 TO 19:INPUT #4;TMP:ACTUAL(I)=TMP:NEXT I
DFJ 1130 FOR I=0 TO 19:INPUT #4;TMP:BUDGET(I)=TMP:NEXT I
DBJ 1140 CLOSE #4:IF MONTH=1 THEN 1210
QAJ 1150 IN$="D:MONTH":IN$(8)=STR$(MONTH-1)
FYJ 1160 TRAP 1200:OPEN #4,4,0,IN$:INPUT #4;LAST:INPUT #4;LB
XEJ 1170 FOR I=0 TO 19:INPUT #4;TMP:LAST(I)=TMP:NEXT I
QVJ 1180 FOR I=0 TO 19:INPUT #4;TMP:LB(I)=TMP:NEXT I
CXJ 1190 RETURN
EBJ 1200 FOR I=0 TO 19:LAST(I)=0:LB(I)=0:NEXT I:LB=0:LAST=LB:RETURN
LSJ 1210 TY=PEEK(84)
NRJ 1220 POSITION 2,TY:PRINT D$;"DO YOU HAVE DISK FOR ";CYR+YEAR-1;"?";
OAJ 1230 GET #1,N:PRINT CHR$(N);
WGJ 1240 IF N<>78 AND N<>89 THEN 1210
IGJ 1250 IF N=78 THEN RETURN
MBJ 1260 POKE 752,1:PRINT :PRINT :POKE 85,6:PRINT "INSERT LAST YEAR'S DISKETTE"
JAJ 1270 POKE 85,5:PRINT "PRESS START WHEN READY TO LOAD";
OZJ 1280 A=USR(ADR(INVERSE$),11,PEEK(84),5)
TOJ 1290 IF PEEK(53279)<>6 THEN 1290
FEJ 1300 TRAP 1380:CLOSE #4:OPEN #4,4,0,"D:MONTH12"
XFJ 1310 INPUT #4;LAST:INPUT #4;LB
XBJ 1320 FOR I=0 TO 19:INPUT #4;TMP:LAST(I)=TMP:NEXT I
MXJ 1330 FOR I=0 TO 19:INPUT #4;TMP:LB(I)=TMP:NEXT I:CLOSE #4
MCJ 1340 PRINT :PRINT :PRINT :POKE 85,9:PRINT "REPLACE NEW DISKETTE"
OHJ 1350 POKE 85,8:PRINT "PRESS START WHEN READY";
ASJ 1360 A=USR(ADR(INVERSE$),14,PEEK(84),5):POKE 85,8:L=22:GOSUB 1940
TMJ 1370 IF PEEK(53279)<>6 THEN 1370
CYJ 1380 RETURN
SPJ 1390 CLOSE #4:OPEN #4,8,0,FILE$
PDJ 1400 FOR I=0 TO 41:PRINT #4;0
UMJ 1410 IF I<20 THEN BUDGET(I)=0:ACTUAL(I)=0
VUJ 1420 NEXT I:CLOSE #4
FFJ 1430 GOTO 1140
RXJ 1440 MENU$=CHR$(0):MENU$(960)=CHR$(0):MENU$(2)=MENU$
VXJ 1450 POSITION 0,0:POKE 752,1:PRINT CHR$(30);CHR$(31);
CNJ 1460 A=USR(ADR(WINDOW$),ADR(MENU$),2,1,12,22)
KOJ 1470 POSITION 2,1:PRINT "COMMAND MENU":A=USR(ADR(INVERSE$),2,1,12)
LXJ 1480 POSITION 2,2:PRINT "HOLD CONTROL":POKE 85,4:PRINT "KEY DOWN"
GRJ 1490 POKE 85,6:PRINT "WHEN":POKE 85,4:PRINT "PRESSING"
JIJ 1500 POKE 85,2:PRINT "COMMAND KEYS"
ADJ 1510 POSITION 3,8:PRINT CHR$(193);"DD AMOUNT":PRINT
GOJ 1520 PRINT CHR$(32);CHR$(211);"UBTRACT":PRINT
YEJ 1530 PRINT CHR$(32);CHR$(212);"OGGLE LAST":PRINT "MONTH'S BDGT"
ICJ 1540 PRINT CHR$(32);CHR$(208);"RINTOUT":PRINT
MPJ 1550 PRINT CHR$(32);CHR$(209);"UIT AND"
VMJ 1560 PRINT CHR$(32);"SAVE DATA"
QLJ 1570 PRINT :PRINT CHR$(32);"PRESS ESC"
XZJ 1580 A=USR(ADR(INVERSE$),9,19,3)
YTJ 1590 PRINT "TO CONTINUE":POSITION 0,0:PRINT CHR$(30);CHR$(31);
ABJ 1600 A=USR(ADR(INVERSE$),2,22,12)
RFJ 1610 POKE 764,255:POKE 1769,148
QWJ 1620 IF PEEK(764)=255 THEN 1620
CMJ 1630 A=USR(ADR(WINDOW$),ADR(MENU$),2,1,12,22)
JBJ 1640 IF PEEK(764)=28 THEN POKE 764,255
PFJ 1650 A=USR(ADR(INVERSE$),XP(COL),YP,7+5*(COL=0)):POKE 1769,144:RETURN
AUJ 1660 A=USR(ADR(WINDOW$),ADR(MENU$),2,1,12,22):GOTO 1610
WYJ 1670 GRAPHICS 0:POKE 711,144:POKE 623,17:POKE 710,144:POKE 712,144
NIJ 1680 POKE 16,64:POKE 53774,64
DCJ 1690 RETURN
QQJ 1700 IF PEEK(195)=170 THEN 1720
RRJ 1710 PRINT "ERROR #";PEEK(195);:GOTO 370
YWJ 1720 POKE 84,12:PRINT "OPEN NEW FILE ON THIS DISKETTE (Y/N)?";
IUJ 1730 T=PEEK(SX):L=37:POSITION 2,12:GOSUB 1940
RRJ 1740 GET #1,N:IF N<>89 AND N<>78 THEN 1720
UXJ 1750 IF N=78 THEN 370
HAJ 1760 GOSUB 1770:GOTO 1870
TUJ 1770 POSITION 2,14:PRINT D$;"ENTER THE DATE (ex: 5/8/86): ";:T=PEEK(SX)
FHJ 1780 POSITION 2,14:L=28:GOSUB 1940
TQJ 1790 TRAP 1770:INPUT #16;DATE$
AHJ 1800 MONTH=VAL(DATE$):GOSUB 1810:GOTO 1830
KYJ 1810 IF DATE$(2,2)="/" THEN DATE$=DATE$(3):RETURN
MJJ 1820 DATE$=DATE$(4):RETURN
TPJ 1830 DAY=VAL(DATE$)
IHJ 1840 GOSUB 1810
VYJ 1850 YEAR=VAL(DATE$):IF YEAR<0 OR YEAR>99 THEN 1770
DBJ 1860 RETURN
WAJ 1870 GOSUB 1670:POSITION 9,5:PRINT "OPENING FILE - STAND BY"
HFJ 1880 POKE 752,1
MLJ 1890 POSITION 8,4:L=25:H=1:GOSUB 2020
RPJ 1900 CLOSE #3:OPEN #3,8,0,"D:HEADING.DAT"
LLJ 1910 PRINT #3;YEAR:FOR I=1 TO 19:PRINT #3;SP$(1,12):NEXT I
DKJ 1920 CLOSE #3
DTJ 1930 GOTO 470
FEJ 1940 IF KBH THEN POKE 764,KBH:KBH=0:GOTO 2010
VJJ 1950 H=PEEK(SX):POKE 764,255:POKE 752,1:PRINT CHR$(30);CHR$(31);
NTJ 1960 POKE SX,H:FOR I=1 TO 6
FXJ 1970 A=USR(ADR(INVERSE$),PEEK(85),PEEK(84),L)
NCJ 1980 FOR W=1 TO 3
HNJ 1990 IF I/2=INT(I/2) AND PEEK(764)<>255 THEN 2010
TMJ 2000 NEXT W:NEXT I
KWJ 2010 POKE 752,0:POKE SX,T:PRINT CHR$(30);CHR$(31);:RETURN
DQJ 2020 XI=PEEK(85):YI=PEEK(84):PRINT CHR$(17);
HAJ 2030 FOR I=1 TO L-2:PRINT CHR$(18);:NEXT I:PRINT CHR$(5)
EYJ 2040 FOR J=1 TO H:POKE 85,XI:PRINT CHR$(124);
AYJ 2050 POKE SX,XI+L-1:PRINT CHR$(124):NEXT J
YRJ 2060 POKE SX,XI:PRINT CHR$(26);
HCJ 2070 FOR I=1 TO L-2:PRINT CHR$(18);:NEXT I:PRINT CHR$(3)
CWJ 2080 RETURN
SIJ 2090 DATA DECEMBER
QXJ 2100 DATA JANUARY
TQJ 2110 DATA FEBRUARY
KGJ 2120 DATA MARCH
KUJ 2130 DATA APRIL
FGJ 2140 DATA MAY
IEJ 2150 DATA JUNE
IXJ 2160 DATA JULY
ORJ 2170 DATA AUGUST
```

program continued on page 197

Applying The Atari continued from page 76

ternally while the expense categories are assigned negative values).

The other two columns you can change or add to are this month's BUDGET and ACTUAL columns. Numeric values for each category can range from -9,999 to 99,999. The total monthly balance can range from -99,999 to 999,999. Your first task is to design a balanced budget that will give you a zero or positive balance (the balance is displayed at the bottom of the column). Then, as the month progresses, use the ACTUAL column to record the actual expenditures that you make over the course of the month. By comparing the ACTUAL column to the BUDGET column, you can see exactly where you need to cut back, and where you can spend more freely. On the diskette version of *BudgetMate*, changes or additions to the ACTUAL column will bring you to a detail screen (see **Photo 4**) where you can record the actual transaction.

Last month's ACTUAL column will be empty when you first start using the program, but after the first month this column will show you what you actually spent in each category (and how much you earned in the income category) in the previous month. This will help you to plan a much more easily adhered-to budget for the current month, since last month's actual figures should give you a good estimation of the current month's requirements for most of the categories.

Five control commands are used for your budget planning and actual record keeping. Press CONTROL-A to *add* a value to an existing one. On the numeric keypad, the minus sign (-) has been redefined to be the CONTROL-A key, since this feature is used often. For example, if you just went out and bought $100 worth of clothing, you would move the cursor down to the CLOTHING category line and then over to the ACTUAL column. Then you would press CONTROL-A (or - on the keypad), type 100 and press RETURN. 100 dollars will be automatically added to the existing amount in that category. The subtract command, CONTROL-S, does just the opposite. The add and subtract commands can be used on both the BUDGET and the ACTUAL columns.

The CONTROL-T command allows you to switch in last month's budget. Thus, if you were able to adhere to last month's budget well, you can copy it for this month's budget and modify whatever amounts are necessary. Pressing CONTROL-T again will return the original current budget, should you change your mind once you see last month's budget.

The CONTROL-P command gives you a printout of the budget screen. You can obtain a hardcopy of any month's data by loading in that month's data (enter a date in that month when asked to type in the current date). Then use the CONTROL-P command to print out the budget screen.

The CONTROL-Q command is the quit command. *It is extremely important that you remember to press CONTROL-Q once you have finished adding/changing data,* since this command tells *BudgetMate* to save all changes and additions to diskette. If you forget to press the CONTROL-Q command and turn off your computer, you will lose whatever additions you made for that day, so always remember to use this command when you are finished. You can use *BudgetMate* on a daily, weekly, or monthly basis, depending on how often you need to add to the expense categories and how much you want to monitor your budget.

Next Month

We'll learn how *BudgetMate* works, plus we'll enter some reader-modified utility programs.

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply.

The BudgetMate diskette is available from the author for $7.00, postpaid. Please make checks payable to Jeff Brenner; and specify your disk drive model.

"Program Perfect" is a utility used to check for typing errors while entering programs from this column. Readers may send $5.00 for a diskette or a SASE for a listing of this program.

Address all correspondence to: Jeff Brenner, "Applying The Atari 6/86", c/o Computer Shopper, P.O. Box F, Titusville, FL 32781-9990. ●

Budgetmate Program continued from page 196

```
WQJ 2180 DATA SEPTEMBER
QUJ 2190 DATA OCTOBER
WFJ 2200 DATA NOVEMEBER
SCJ 2210 DATA DECEMBER
AZJ 2220 COL=0:POKE 764,255
NJJ 2230 A=USR(ADR(INVERSE$),XP(COL),YP,7+5*(COL=0))
NDJ 2240 SOUND 0,0,0,0
HHJ 2250 KB=PEEK(764):IF KB=255 THEN 2250
CCJ 2260 POKE 764,255:IF ER=0 THEN 2280
SWJ 2270 POSITION 0,23:ER=0:PRINT SP$(1,35);
VYJ 2280 SOUND 0,8,12,4:POKE 53768,64
YTJ 2290 IF KB=12 THEN 2450
NHJ 2300 A=USR(ADR(INVERSE$),XP(COL),YP,7+5*(COL=0))
IXJ 2310 IF KB=7 OR KB=135 THEN COL=COL+1:IF COL>2 THEN COL=0
EGJ 2320 IF KB=6 OR KB=134 OR KB=52 THEN COL=COL-1:IF COL<0 THEN COL=2
EMJ 2330 IF KB=14 OR KB=142 THEN YP=YP-1:IF YP<2 THEN YP=21
EQJ 2340 IF KB=15 OR KB=135 THEN YP=YP+1:IF YP>21 THEN YP=2
DFJ 2350 IF KB=28 THEN GOSUB 1660:GOTO 2250
UWJ 2360 IF KB=191 AND COL THEN 3240
UYJ 2370 IF KB=190 AND COL THEN 3350
SFJ 2380 IF KB=175 THEN GOSUB 2870
RRJ 2390 IF KB=138 THEN GOSUB 3000
RQJ 2400 IF KB=173 THEN GOSUB 3170
YPJ 2410 IF KB>127 OR KB=6 OR KB=7 OR KB=14 OR KB=15 OR KB=52 THEN 2230
GPJ 2420 KBH=KB:A=USR(ADR(INVERSE$),XP(COL),YP,7+5*(COL=0))
FLJ 2430 GOTO 2450
FIJ 2440 GOTO 2230
LDJ 2450 SCR$(1)=CHR$(0):SCR$(960)=CHR$(0):SCR$(2)=SCR$
YXJ 2460 A=USR(ADR(WINDOW$),ADR(SCR$),1,22,39,1)
AYJ 2470 IF COL=0 THEN 2640
CBJ 2480 POSITION 2,22:PRINT D$;"NEW VALUE: ";:T=PEEK(85)
EWJ 2490 POSITION 2,22:L=10:GOSUB 1940
YTJ 2500 TRAP 2730:INPUT #16;VALUE:VALUE=INT(VALUE+0.5)
VVJ 2510 POKE 752,1:POSITION 0,0:PRINT CHR$(30);CHR$(31);
CGJ 2520 IF VALUE<-9999 OR VALUE>99999 THEN 2480
RIJ 2530 A=USR(ADR(INVERSE$),XP(COL),YP,7)
OSJ 2540 FL=1:IF YP=2 THEN FL=-1
DJJ 2550 IF COL<>1 THEN 2570
IHJ 2560 BUDGET=BUDGET+FL*BUDGET(YP-2)-FL*VALUE:BUDGET(YP-2)=VALUE
DOJ 2570 IF COL<>2 THEN 2590
IFJ 2580 ACTUAL=ACTUAL+FL*ACTUAL(YP-2)-FL*VALUE:ACTUAL(YP-2)=VALUE
OXJ 2590 POSITION XP(COL)+1,YP
EXJ 2600 I=LEN(STR$(VALUE))
SZJ 2610 IF I<5 THEN PRINT SP$(1,5-I);VALUE;
UWJ 2620 IF I=5 THEN PRINT VALUE;
FPJ 2630 GOTO 2740
NAJ 2640 POSITION 2,22:PRINT D$;"NEW CATEGORY: ";:T=PEEK(SX)
EXJ 2650 POSITION 2,22:L=13:GOSUB 1940
FRJ 2660 INPUT #16;IN$:POKE 752,1:POSITION 0,0:PRINT CHR$(30);CHR$(31);
LJJ 2670 IF LEN(IN$)=0 THEN 2730
HUJ 2680 IF LEN(IN$)>12 THEN IN$=IN$(1,12)
DTJ 2690 IF LEN(IN$)<12 THEN IN$(LEN(IN$)+1,12)=SP$
MBJ 2700 HEADING$((YP-2)*12-11,(YP-2)*12)=IN$
EHJ 2710 POSITION XP(COL),YP:PRINT IN$;:POSITION 0,0:PRINT CHR$(30);CHR$(31);
FPJ 2720 GOTO 2740
NOJ 2730 A=USR(ADR(INVERSE$),XP(COL),YP,7+5*(COL=0))
YGJ 2740 A=USR(ADR(WINDOW$),ADR(SCR$),1,22,39,1):GOSUB 2750:GOTO 2230
IFJ 2750 POSITION XP(COL)-1,22:IF COL<>1 THEN 2800
LDJ 2760 I=LEN(STR$(BUDGET))+2
UKJ 2770 IF I<9 THEN PRINT SP$(1,9-I);BUDGET;:GOTO 2850
WDJ 2780 IF I=9 THEN PRINT BUDGET;:GOTO 2850
FXJ 2790 GOTO 2840
NWJ 2800 IF COL<>2 THEN RETURN
KYJ 2810 I=LEN(STR$(ACTUAL))+2
UFJ 2820 IF I<9 THEN PRINT SP$(1,9-I);ACTUAL;:GOTO 2850
VYJ 2830 IF I=9 THEN PRINT ACTUAL;:GOTO 2850
SOJ 2840 PRINT CHR$(32);"OVRFLW";
EMJ 2850 POSITION 15,22:PRINT "TOTALS:":A=USR(ADR(INVERSE$),15,22,7)
RVJ 2860 POKE 752,1:POSITION 0,0:PRINT CHR$(30);CHR$(31);:RETURN
POJ 2870 TRAP 2970:POKE 54286,64:POKE 710,144
EBJ 2880 CLOSE #4:OPEN #4,8,0,"D:HEADING.DAT":PRINT #4;YEAR
EVJ 2890 FOR I=1 TO 19:PRINT #4;HEADING$(I*12-11,I*12):NEXT I
SNJ 2900 CLOSE #4:OPEN #4,8,0,FILE$
OZJ 2910 PRINT #4;ACTUAL:PRINT #4;BUDGET
FGJ 2920 FOR I=0 TO 19:PRINT #4;ACTUAL(I):NEXT I
FIJ 2930 FOR I=0 TO 19:PRINT #4;BUDGET(I):NEXT I
DOJ 2940 CLOSE #4
WGJ 2950 FOR I=53252 TO 53255:POKE I,0:NEXT I:POKE 53248,0
ISJ 2960 POP :GRAPHICS 0:END
TEJ 2970 POKE 710,148:POKE 54286,192
MVJ 2980 POSITION 2,23:PRINT "SAVING ERROR #";PEEK(195);:ER=1
KSJ 2990 POSITION 2,23:L=17:T=0:GOSUB 1940:RETURN
LCJ 3000 POKE 54286,64:TRAP 3140
VKJ 3010 POKE 752,1:POSITION 0,0:PRINT CHR$(30);CHR$(31);
AHJ 3020 A=USR(ADR(INVERSE$),15,22,7)
NUJ 3030 CLOSE #4:OPEN #4,8,0,"P:"
KQJ 3040 FOR Y=0 TO 22:IF Y<2 THEN A=USR(ADR(INVERSE$),0,Y,40)
PXJ 3050 POSITION 2,Y:INPUT #2;IN$:A=USR(ADR(INVERSE$),0,Y,40)
POJ 3060 IF Y>1 AND Y<22 THEN 3110
PGJ 3070 FOR I=1 TO LEN(IN$):A=ASC(IN$(I,I))
VOJ 3080 IF A>31 AND A<97 THEN PRINT #4;CHR$(A);:GOTO 3100
ATJ 3090 PRINT #4;CHR$(32);
URJ 3100 NEXT I:PRINT #4:GOTO 3120
JLJ 3110 IN$(13,14)=SP$:IN$(20,22)=SP$:IN$(28,30)=SP$:PRINT #4;IN$
DCJ 3120 IF Y>1 THEN A=USR(ADR(INVERSE$),0,Y,40)
XFJ 3130 NEXT Y:POKE 54286,192:A=USR(ADR(INVERSE$),15,22,7):RETURN
IKJ 3140 POKE 54286,192:A=USR(ADR(INVERSE$),15,22,7)
SSJ 3150 POSITION 2,23:PRINT "PRINTING ERROR #";PEEK(195);:ER=1
KKJ 3160 POSITION 2,23:T=0:L=19:GOSUB 1940:RETURN
PIJ 3170 FOR I=0 TO 19:TMP=LB(I):LB(I)=BUDGET(I):BUDGET(I)=TMP
DAJ 3180 A=USR(ADR(INVERSE$),24,I+2,5)
NRJ 3190 POSITION 24,I+2:IF TMP=0 THEN J=1:GOTO 3210
YLJ 3200 J=LEN(STR$(TMP))
JMJ 3210 IF J<5 THEN PRINT SP$(1,5-J);TMP:GOTO 3230
NDJ 3220 IF J=5 THEN PRINT TMP
QIJ 3230 NEXT I:TMP=LB:LB=BUDGET:BUDGET=TMP:COL=1:GOTO 2750
LBJ 3240 SCR$(1)=CHR$(0):SCR$(960)=CHR$(0):SCR$(2)=SCR$
YVJ 3250 A=USR(ADR(WINDOW$),ADR(SCR$),1,22,39,1)
DFJ 3260 POSITION 2,22:PRINT D$;"ADD WHAT VALUE: ";:FL=1:T=PEEK(SX)
EYJ 3270 POSITION 2,22:L=15:GOSUB 1940
VDJ 3280 VALUE=0:TRAP 3290:INPUT #16;VALUE:VALUE=INT(VALUE+0.5)
WBJ 3290 POKE 752,1:POSITION 0,0:PRINT CHR$(30);CHR$(31);
NSJ 3300 IF COL=1 THEN VALUE=BUDGET(YP-2)+VALUE*FL
NTJ 3310 IF COL=2 THEN VALUE=ACTUAL(YP-2)+VALUE*FL
QQJ 3320 POSITION 2,23:PRINT SP$(1,14);:POSITION 2,23
XNJ 3330 IF VALUE<-9999 OR VALUE>99999 THEN PRINT "VALUE TOO BIG";:GOTO 3260
FMJ 3340 GOTO 2540
LDJ 3350 SCR$(1)=CHR$(0):SCR$(960)=CHR$(0):SCR$(2)=SCR$
YXJ 3360 A=USR(ADR(WINDOW$),ADR(SCR$),1,22,39,1)
UZJ 3370 POSITION 2,22:PRINT D$;"SUBTRACT WHAT VALUE: ";:FL=-1:T=PEEK(SX)
EWJ 3380 POSITION 2,22:L=20:GOSUB 1940
FTJ 3390 GOTO 3280
EJJ 3400 DATA 124,102,120,62,126,126,99,24,126,126,102,102,108,96,96,24
DPJ 3410 DATA 119,60,24,96,124,102,102,96,124,24,127,102,24,124,102,102
CHJ 3420 DATA 102,110,96,24,107,102,24,96,102,102,108,102,96,24,99,126
YHJ 3430 DATA 24,96,124,126,120,62,126,24,99,102,24,126
WFJ 3440 GRAPHICS 4:SETCOLOR 2,9,0:SETCOLOR 4,9,0:SETCOLOR 0,9,10
COJ 3450 S=PEEK(88)+256*PEEK(89)+80:DL=PEEK(560)+256*PEEK(561)
HFJ 3460 POKE 559,0
MGJ 3470 RESTORE 3400:FOR I=0 TO 59:READ N:POKE S+I,N:NEXT I:POKE 559,34
PHJ 3480 POKE DL+23,6:POKE DL+24,6:POKE 87,1
XGJ 3490 IN$="COPYRIGHT 1986":POSITION 3,9:PRINT #6;IN$
ULJ 3500 IN$="JEFF BRENNER":POSITION 4,10:PRINT #6;IN$
HCJ 3510 POKE 752,1:PRINT SP$(1,9);"Please stand by..."
DMZ 3520 RETURN
```

Guru Integrated Software continued from page 105

the overall possibilities offered by the integration with the rest of GURU.

Documents produced can include all sorts of graphics, placed in the text in locations you specify and prepared from data in the spreadsheet or data base. The only limit I found was my printer. If I were using this in a business situation I would be sure to buy the best printer I could, possibly including color. Colors and resolution are excellent additions to reports prepared by GURU's text processor.

Again GURU is all menu driven with little chance to make mistakes. Almost takes all the mystery out of the computer. All the functions of a reasonable word processor are included in this one. I have a problem with most of the IBM compatible word processors as I am still hung up on Allwrite and LeScript on a Model 4. It isn't really fair to compare other programs to either one of them for ease of use and results.

If you have used a word processor on a IBM or compatible you will have very little trouble with this one. It will take a little while to get accustomed to it before you will get the speed you are getting from whatever you are using now but that is true of changing to any new word, or text, processor.

Expert Systems

Using an expert system is somewhat like having a consultant sitting in the room with you while you work. It provides expertise that you may or may not have on hand for GURU to use as it needs it to develop a solution to a problem. The expert system is a set of RULES established for the program to use. These rules are set using expertise available about a subject or subjects that you will have GURU involved with.

These rulers are "If-then" or "go-no-go" statements that allow the AI section of GURU to reach a conclusion or solution to a problem. Using the CONSULT command GURU is instructed to go to a set(s) of these rules for the parameters for advice. If a rule is met then it is "fired" and the actions set forth are carried out. If not then the next rule is consulted. A sample of this type of rule might be; "SALES>QUOTA".

This part of GURU gave me the most trouble as I have no great claims to be a programmer. However the documentation is clear and with a little time you will be producing sets of rules that will help GURU on its way to being the expert decision maker you need. The rule sets for the expert systems are built with a generator in the program, or with the text editor. In the rules-set GURU can perform a number of mathematical calculations, handle strings using eight different handling functions including a sub string search and use certainty factors ranging from 0 to 100.

The consultation of the rule sets can be with forward or reverse chaining or both. GURU can be instructed to explain its reasoning and it will display what it has done and why—which rules have been fired and the parameters that allowed the firing.

As I stated above GURU has a built in vocabulary of 500 words that you will increase as you use the program. Like a word processing dictionary it will grow with terminology to suit your particular needs. At any point in the program you can go to the CHAT mode and ask GURU a question. The one I used in the demo was, "How Many Employees Earn $20,000 or more a year?" GURU went off into a dark corner and came back with a list of the employees that met the requirements after I defined "Earn" with the term "Salary."

It was at this point that I began to grow enchanted with this package. It set up a sort of selected field and generated a report on the screen as a result of that one question. I began to count the steps that were needed to do that same process with Profile and fell in love. The only limit to the questions is the vocabulary that you build. If GURU doesn't understand it will respond with a question of its own to get clarification from you.

Graphics

GURU's graphic capability surprised me. For an integrated package it has a lot to offer in the area of graph and chart production. Line types, colors, point and fill patterns are menu selected. Symbols, logos and pictograms can be added to spice things up. Again the choice of printer is important as it serves as a limiting factor as to what you can do with the Graphics section. GURU offers a number of plotter drivers on the distribution disk. Set up is well documented in the reference manual under "Graphics."

I have included Three of the graph types with this article (Figs. 11-13). Please understand that these are screen dumps on a DMP and are not good examples of the resolution and clarity of GURU's graphic ability.

Using menu selections you are able to locate a graph or chart in any one of nine positions (Fig. 10) on the screen—making it possible to use up to 4 graphs at the same time. All the normal type of graphs you would use are available through the menus (Fig 9). Set up is simple using data from the data base or spreadsheet. GURU does all the work.

Communications

If you have a modem you will use it with GURU. It is easy to set up the parameters for operation. Again it is menu driven and all you have to do is answer prompts. The program opens the port, dials the number, allows the communication and hangs up on command. This can be over phone line or direct computer to computer.

File transfers, login, logout and terminal emulation are as available as the menu. Don't get tired of hearing the word MENU as it is a blessing as a time saver in GURU. The use of the menu system allows you to leave the manuals on the shelf most of the time. Even with this I have to say that the documentation for communications is especially good in the reference manual and is worth reading just for the education you will get.

And The Rest..

Custom screens and reports are handled under the LAYOUT menus. Simply stated you put what you want, where you want it and whatever color you want it to be. This feature is a valuable asset to someone designing a system for someone else to use. You can eliminate most of the possibilities or error in data entry by the design of the screen and control of the type of input you want.

Reports that can be generated are limited only by the limits of your imagination. Again menus guide the way through the process.

From the OPERATIONS menu you can go outside of GURU and run another program or DOS command; execute a Macro of your design; switch directories; copy, compare, rename or delete files; and use a built in calculator.

The ENVIRONMENT menu allows the working environment to be changed as you desire and a host of other changes to be selected. The vocabulary will be added to it as needed up to a maximum of 65,535 words. If GURU doesn't understand, it will ask you to define a word. That

continued on page 201

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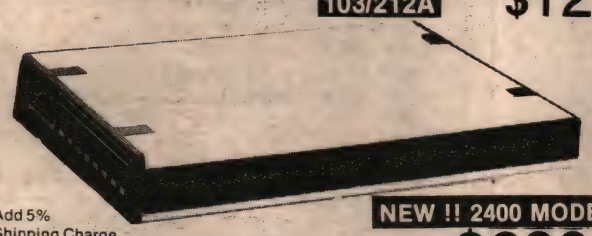
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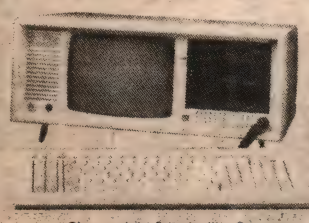


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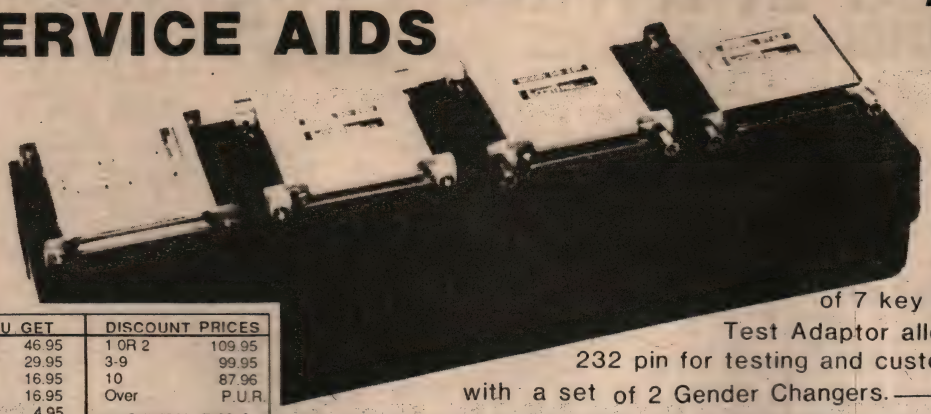


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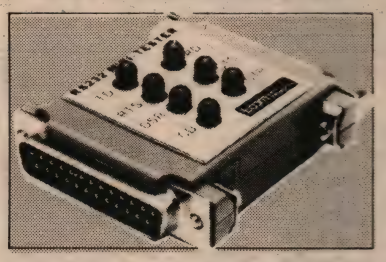
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DATA LINE MONITOR



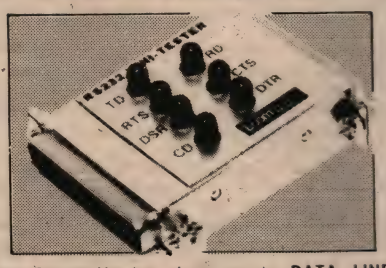
A minature **DATA LINE MONITOR** allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through. Dedicated red LED's report the status of:

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- Receive Data (RD) pin 3
- Request to Send (RTS) pin 4
- Clear to Send (CTS) pin 5
- Data Set Ready (DSR) pin 6
- Data Carrier Detect (DCD) pin 8
- Data Terminal Ready (DTR) pin 20

Choice of Plastic or Chrome Metal Housing.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DLM	Std.	M-F	35.45	32.26	28.36
DLMS	Metal	M-F	36.95	33.62	29.56

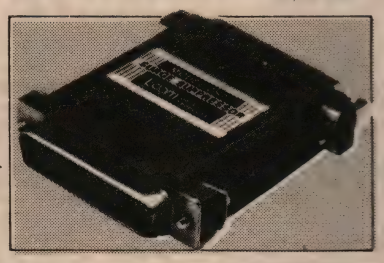
DATA LINE MONITOR



New Deluxe Version of our popular **DATA LINE MONITOR** is now available with red and green LED's to indicate Hi, Low or Open conditions. Metal shell construction takes abuse.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DLMS-2	Metal	M-F	46.95	42.72	37.56

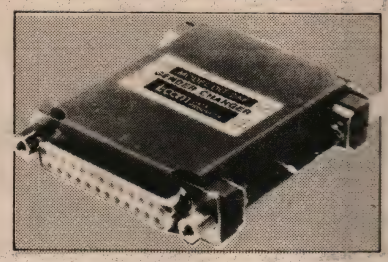
RS232 LINE PROTECTOR



RS-232 DATA LINE SURGE PROTECTORS Guard against lightning and electrical spikes entering the RS-232 ports. Metal-Oxide varistors on key signal lines act to clamp surges above 27 volts without affecting normal operation. This compact adaptor mounts permanently in series. All 25 lines are wired through. To be most effective Surge Protectors should be provided on both ends of a long line.

MODEL	Lines	1-9	10-24	25-99
DSPS-3	2,3 & 7	24.95	22.70	19.96
DSPS-4	2,3,7, & 20	26.95	24.52	21.56
DSPS-5	2,3,4,5,& 7	28.95	26.34	23.16
DSPS-7	2 thru 7 & 20	32.95	29.98	26.36

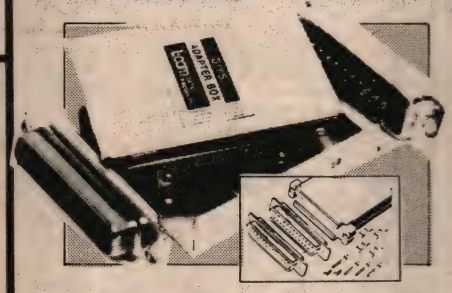
GENDER CHANGER



RS-232 GENDER CHANGERS - Are handy devices enabling the mating of wrong sex cables to equipment or to other cables. ABS encased or metalized to offer maximum shielding, will withstand extensive abuse. Four models fill most requirements.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DG-25F	Std.	F-F	16.95	15.42	13.56
DG-25M	Std.	M-M	16.95	15.42	13.56
DGS-25F	Metalized	F-F	17.95	16.33	14.36
DGS-25M	Metalized	M-M	17.95	16.33	14.36

RS232 ADAPTOR KIT



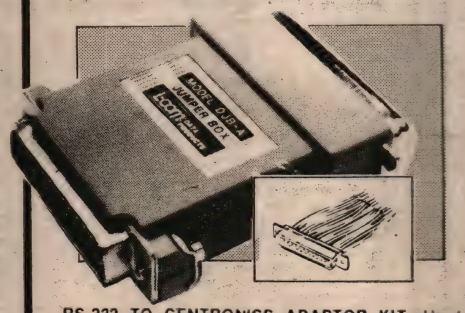
DO IT YOURSELF KIT - Allows the creation of many types of RS-232 adaptors. The following components are included in the assortments.

- 2 ea. 25 Pin D-Sub Connectors (see gender below)
- 2 ea. Snap-on half covers (UL 94VO)
- 1 set Hardware for each connector end

D-Sub connectors have solder cup terminations to accept wire leads. Choice of Plastic or Chrome Metal Housing.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DIY	Std.	M-F	10.95	9.96	8.76
DIYS	Metal	M-F	12.45	11.33	9.96
DIYS-F	Metal	F-F	12.45	11.33	9.96
DIYS-M	Metal	M-M	12.45	11.33	9.96

SERIAL-PARALLEL ADAPTOR KIT



RS-232 TO CENTRONICS ADAPTOR KIT - Used to customize your own printer adaptors. The DB-25 has 25 flying leads, ready to be soldered to any of the 36 pin Centronics. Your choice of standard or metalized covers.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DJBA	Std.	M-M	24.95	22.70	19.95
DJBA-2	Metalized	M-M	26.95	24.52	21.56

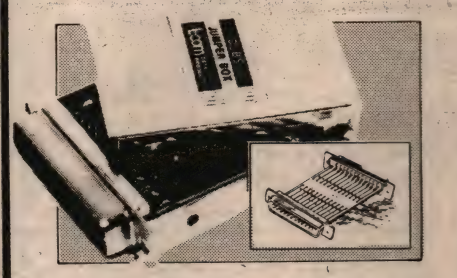
RS232 TEST ADAPTOR



A minature **DATA TEST ADAPTOR** provides ready access to all 25 lines of the RS-232 interface. Only 2" x 2.5" x 0.5" in size. Has one male and one female connector for inline use. All 25 pins of each connector terminate to individual sockets which allow the two connectors to be interwired or jumped in any pattern. Comes complete with 20 jumper wires. Shielded Chrome Metal construction.

MODEL	TYPE	1-9	10-24	25-99
DTAS	Metal	29.95	27.25	23.96

RS232 JUMPER BOX



DATA JUMPER BOX - Used to customize RS-232 interface devices. All 25 pins of the D-Sub Connectors terminate to 25 solder pads. The PC Board layout makes it easy to wire your own adaptor. Supplied with 25 wires already stripped for permanent wiring. Many interfaces could be built, null modems, pin reversers, you name it. Supplied with PC Board already soldered in place. Snap-on Chrome Metal covers and appropriate hardware are unassembled. Your choice of genders.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DJBS	Metal	M-F	21.95	19.97	17.56
DJBS-F	Metal	F-F	21.95	19.97	17.56
DJBS-M	Metal	M-M	21.95	19.97	17.56

MODEM ADAPTOR



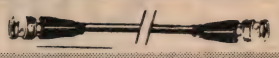
MODEM ADAPTORS - Eliminate the need for modems when connecting local terminals together or terminals to computer. Circuit codes are shown to identify pin connections.



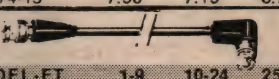
MODEL	TYPE	GENDER	1-9	10-24	25-99
DGA-25A	Std.	M-F	16.95	15.42	13.56
DGA-25B	Std.	M-F	16.95	15.42	13.56
DGA-25C	Std.	M-F	16.95	15.42	13.56

Ask us to quote on Custom RS232 Adapters

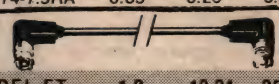
COAXIAL CABLES



MODEL-FT	1-9	10-24	25-99
CC58C-1	3.55	3.23	3.05
CC58C-1.5	3.70	3.37	3.18
CC58C-2	3.85	3.50	3.31
CC58C-2.5	4.10	3.73	3.53
CC58C-4	4.40	4.00	3.78
CC58C-5	4.65	4.23	4.00
CC58C-10	6.05	5.51	5.20
CC58C-15	7.45	6.78	6.41
CC58C-25	10.75	9.33	9.25
CC59B-1	3.65	3.32	3.14
CC59B-2.5	4.00	3.64	3.44
CC59B-5	4.75	4.32	4.09
CC59B-10	6.25	5.69	5.38
CC59B-15	7.75	7.05	6.67
CC59B-25	10.75	9.78	9.25
CC59B-50	18.25	16.61	15.70
CC59B-100	33.25	30.26	28.60
CC62A-1	3.60	3.28	3.10
CC62A-2.5	3.95	3.59	3.40
CC62A-5	4.70	4.28	4.04
CC62A-10	6.15	5.60	5.29
CC62A-15	7.60	6.92	6.54
CC62A-25	10.50	9.56	9.03
CC62A-50	17.75	16.15	15.27
CC62A-100	32.25	29.35	27.74
CC174-1	3.60	3.28	3.10
CC174-1.5	3.75	3.41	3.23
CC174-2	3.90	3.55	3.35
CC174-2.5	4.05	3.69	3.48
CC174-4	4.50	4.10	3.87
CC174-5	4.80	4.37	4.13
CC174-10	6.35	5.78	5.46
CC174-15	7.90	7.19	6.79



MODEL-FT	1-9	10-24	25-99
CC58C-1RA	4.90	4.46	4.21
CC58C-1.5RA	5.05	4.60	4.34
CC58C-2RA	5.20	4.73	4.47
CC58C-2.5RA	5.35	4.87	4.60
CC58C-3RA	5.50	5.00	4.73
CC58C-4RA	5.80	5.28	4.99
CC58C-5RA	6.10	5.55	5.25
CC58C-7.5RA	6.85	6.23	5.89
CC58C-10RA	7.60	6.92	6.54
CC59B-1RA	4.90	4.46	4.21
CC59B-1.5RA	5.05	4.60	4.34
CC59B-2RA	5.20	4.73	4.47
CC59B-2.5RA	5.35	4.87	4.60
CC59B-3RA	5.50	5.00	4.73
CC59B-4RA	5.80	5.28	4.99
CC59B-5RA	6.10	5.55	5.25
CC59B-7.5RA	6.85	6.23	5.89
CC59B-10RA	7.60	6.92	6.54
CC62A-1RA	4.90	4.46	4.21
CC62A-1.5RA	5.05	4.60	4.34
CC62A-2RA	5.20	4.73	4.47
CC62A-2.5RA	5.35	4.87	4.60
CC62A-3RA	5.50	5.00	4.73
CC62A-4RA	5.80	5.28	4.99
CC62A-5RA	6.10	5.55	5.25
CC62A-7.5RA	6.85	6.23	5.89
CC62A-10RA	7.60	6.92	6.54
CC174-1RA	4.90	4.46	4.21
CC174-1.5RA	5.05	4.60	4.34
CC174-2RA	5.20	4.73	4.47
CC174-2.5RA	5.35	4.87	4.60
CC174-3RA	5.50	5.00	4.73
CC174-4RA	5.80	5.28	4.99
CC174-5RA	6.10	5.55	5.25
CC174-7.5RA	6.85	6.23	5.89



MODEL-FT	1-9	10-24	25-99
CC58C-1RA2	6.25	5.69	5.38
CC58C-1.5RA2	6.40	5.82	5.50
CC58C-2RA2	6.55	5.96	5.63
CC58C-2.5RA2	6.70	6.10	5.76
CC58C-3RA2	6.85	6.23	5.89
CC58C-4RA2	7.15	6.51	6.15
CC58C-5RA2	7.45	6.78	6.41
CC58C-7.5RA2	8.20	7.46	7.05
CC58C-10RA2	8.95	8.14	7.70
CC59B-1RA2	6.25	5.69	5.38
CC59B-1.5RA2	6.40	5.82	5.50
CC59B-2RA2	6.55	5.96	5.63
CC59B-2.5RA2	6.70	6.10	5.76
CC59B-3RA2	6.85	6.23	5.89
CC59B-4RA2	7.15	6.51	6.15
CC59B-5RA2	7.45	6.78	6.41
CC59B-7.5RA2	8.20	7.46	7.05
CC59B-10RA2	8.95	8.14	7.70
CC62A-1RA2	6.25	5.69	5.38
CC62A-1.5RA2	6.40	5.82	5.50
CC62A-2RA2	6.55	5.96	5.63
CC62A-2.5RA2	6.70	6.10	5.76
CC62A-3RA2	6.85	6.23	5.89
CC62A-4RA2	7.15	6.51	6.15
CC62A-5RA2	7.45	6.78	6.41
CC62A-7.5RA2	8.20	7.46	7.05
CC62A-10RA2	8.95	8.14	7.70
CC174-1RA2	6.25	5.69	5.38
CC174-1.5RA2	6.40	5.82	5.50
CC174-2RA2	6.55	5.96	5.63
CC174-2.5RA2	6.70	6.10	5.76
CC174-3RA2	6.85	6.23	5.89
CC174-4RA2	7.15	6.51	6.15
CC174-5RA2	7.45	6.78	6.41
CC174-7.5RA2	8.20	7.46	7.05

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Natural Language
Information Manager
Change Environment
Quit

INFORMATION MANAGER

Select this option to work with any of the common business tools used for information management.

Included are: data base, spreadsheet, graphics, word processing, forms and report template generation, and remote communications. All of these capabilities are fully integrated to provide a most powerful working environment.

Figure 1

Guru

Information Manager
Data Management
Spreadsheet
Graphics
Text
Communications
Layouts
Operations
Previous Menu

DATA MANAGEMENT

In this section you can build, edit, look at, and in many ways process data tables.

Data tables are used to store large amounts of information in a file on your disk. This information is organized in a way that allows quick access when data is needed. Think of tables as files full of records, just like a file cabinet.

Figure 2

Guru

Information Manager
Data Management
Table Structuring
Build New Structure
Modify Structure
Show Structure
Delete Table
Previous Menu

BUILD NEW STRUCTURE

This option creates a new, empty table. Use the Enter or Modify Data option to fill it with data.

A table consists of a collection of records. Each record contains related data. For example, a table named EMPLOYEE would have 1 record for each employee. Each record would have 3 fields: NAME, SALARY, ADDRESS. When full, they would hold the actual name, salary and address of an employee. In this example, you would indicate the table name (EMPLOYEE), its fields (NAME, SALARY, ADDRESS), and the type of data it would hold. SALARY would contain numbers. NAME and ADDRESS would hold strings of characters.

Figure 3

Guru

Information Manager
Data Management
Table Structuring
Build New Structure
Build New Structure
Modify Structure
Show Structure
Delete Table
Previous Menu

ENTER NEW TABLE NAME

Enter a name which will uniquely identify the table you are building. This table name must be 1 - 8 characters beginning with a letter.

The table named EMPLOYEE would be stored in a file named "EMPLOYEE.ITB" The ".ITB" file extension indicates to the system that the file contains table information.

Enter new table name:

Figure 4

Guru

Information Manager
Data Management
Table Structuring
Build New Structure
Build New Structure
Modify Structure
Show Structure
Delete Table
Previous Menu

NAME OF FIRST FIELD

A field in a table stores information. For instance, if you are structuring a table to hold employee information and you want to store each employee's name and salary in this table, define two fields named NAME and SALARY.

A record contains one value for each field. In this example, each record will have an employee name and number.

After building the structure for a table, it is empty. Use the Create Records option to fill it with records.

Name of first field (8 letters or less):

DEFINE TEST4 WITH "TEST4.ITB";

Figure 5

Guru

Information Manager
Data Management
Table Structuring
Build New Structure
Build New Structure
Modify Structure
Show Structure
Delete Table
Previous Menu

FIELD LABEL

The field label is optional. It is just a comment which allows for a more detailed field description.

New field label (up to 25 characters):

DEFINE TEST4 WITH "TEST4.ITB";

Figure 6

Guru

Information Manager
Data Management
Build New Structure
Build New Structure
Modify Structure
Show Structure
Delete Table
Previous Menu

Menu Control Keys

Previous Menu - Escape Down -
Main Menu - Home Help - ^L

STRING
DECIMAL NUMBER
WHOLE NUMBER
LOGIC

Choose field type:

DEFINE TEST4 WITH "TEST4.ITB";

Figure 7

Guru

Information Manager
Data Management
Table Structuring
Build New Structure
Build New Structure
Modify Structure
Show Structure
Delete Table
Previous Menu

FIELD PICTURE

A picture controls what values may be entered into a field on a character-by-character basis. It is used for automatic data editing.

Certain lower case letters are used in pictures to define the kinds of data that can be input or displayed at each position of the field's value:

a - letter
c - letter or number
d - digit, sign, decimal point
l - change to lower case
u - change to upper case
r - any character

Sample date picture: dd/dd/dd

Field picture (optional):

DEFINE TEST4 WITH "TEST4.ITB";

Figure 8

Guru

Information Manager
Graphics
Type of Graph
Pie
Line
Flat Bar
3-D Bar
Scatter
Area
HiLo

Menu Control Keys

Previous Menu - Escape Down -
Main Menu - Home Help - ^L

Figure 9

Guru

Information Manager
Graphics
Location on Screen
Full Screen
Top Half
Bottom Half
Right Half
Left Half
Upper Right
Upper Left
Lower Right
Lower Left

Menu Control Keys

Previous Menu - Escape Down -
Main Menu - Home Help - ^L

Figure 10

Figures continued next page

Guru Integrated Software continued from page 198

word can then be added to the dictionary temporarily or permanently as you desire.

Using Guru

Just when I thought I was about through with GURU I was asked what was better about using this package rather than some other (actually the question was "Where is the rest of your article?"). I thought that you could tell from reading to this point why it was better but I sat down and read what was written so far and saw that I had taken a lot for granted. I went home and looked up the documentation on the demonstration program and began to see more that might be of interest to someone looking for a way to solve a business problem by using this software.

As in any data base operation the most important part of the whole darn thing is the planning of what you want the program to do for you. Do your paperwork first before trying to set up a data base or spreadsheet. Decide what information is to be stored and how it has to be recalled. A spread sheet is a little more structured as you usually have a bookkeeping setup to follow or a set of formulas that you have already been using.

I am going to look at several files that were set up to allow the demo program to run as a data base and a spreadsheet. Also, the rule sets that were created to serve as expert systems for the financial advisor. These will give you some idea of why GURU is different and what you have to do to set it up. Keep in mind that, as with many programs, you will grow into GURU. I have always been amazed to hear someone exclaim, "Wow! I never knew that (the program) would do that." Quite often they have been using the program for some time and never explored the program or documentation to learn the capabilities of the software.

The first file is "EMPINFO.itb", a table that will contain the basic information about each employee. To set up this file the menu system was used to go to "USE or FINISH TABLE", then "TABLE STRUCTURING", and "BUILD NEW STRUCTURE". At this point the creation of a table is as outlined above. The following fields were created;

FNAME, STR 10 (a field that will accept a STRING up to 10 characters)

LNAME, STR 10

YEARSAL, NUM, "$sss,sss.ss" (a number field set for dollars and cents, the section in quotes is the optional field picture)

HIREDATE, STR 8, "dd/dd/dd" (Date field)

EMPID, STR 11 "ddd-dd-dddd" (Set for Social Security number)

DEPTID, STR 3 "ddd"

These fields are similar to most fields set up in other data bases and should present no problem. They are stored in the DBM file EMPINFO.itb and can be used with a default screen for the entry of data. The only real difference between these and another data base is the simplicity of the set up. It is absolutely painless!

The second TABLE is DEPTINFO.itb. This table contains only two fields;

DEPT STR 10

DEPTID STR 3 "ddd"

Each employee is identified by DEPTID, a three character string from EMPINFO.itb that is repeated in DEPTID.itb and serves to link the two tables.

The following definitions are included in the DICTIONARY for the use of the natural language feature;

employees = fname lname
last name = lname
first name = fname
hired = hiredate
salary = yearsal
salaries = yearsal
annual salaries = yearsal
over = more than
works = deptid
department = dept

From the Chat function you can ask "Which employees have salaries over $20,000". GURU goes to the table (EMPINFO) and defines "salaries" as "yearsal" and "over" as "more than". A search is set up of the yearsal fields with greater than 20,000 as the basis for the search and a list of the employees is presented on the CRT. If the same question is asked with "earn" substituted for "have salaries" GURU responds with a request to define earn. Answering "earn = yearsal, salaries, annual salaries or salary" allows GURU to search and find the needed data. This eliminates the process of setting up a search of a data base by listing the search parameters and fields as I am accustomed to with the data bases I've used.

If you ask a second question "Who works in marketing" GURU goes to the DEPTINFO table and gets the DEPTID's of all those listed in marketing and then to the EMPINFO table to match the DEPTID with the FNAME and LNAME fields and then lists the names on the CRT. However, it will remember the first question about salary and only produce the employees that make over $20,000. To remedy this ask the question as "Give me all the employees that work in marketing" and if you want the salary information follow with "Give me their salaries."

The financial advisor is set up much the same with the following fields in the Table INDIV.itb, (JOINT.itb and SINGLE.itb are set with the same fields to be used for tax information):

MINWAGE, NUM
PRCNT, NUM
INVESTOR.itb is set to contain (The data in parenthesis is a sample entry):
LNAME, STR, 15 (Rush)
FNAME, STR, 10 (Rachael)
INVNUM, NUM (1.00)
STREET, STR, 30 (3716 Galloway)
CITY, STR, 15 (Carrollton)
STATE, STR, 2 (TX)
ZIP, STR, 10 (11111-)
AGE, NUM, "ddd" (28)
SEX, STR, 1 (F)
MSTAT, STR, 1 (S)
FSTAT, STR, 1 (J)
SOF, STR, 1 (Y)
SAVING, NUM (12200.00)
CHECKING, NUM (1300.00)
PENSION, NUM (0.00)
OTHERSV, NUM (0.00)
STOCKS, NUM (2000.00)
BONDS, NUM (0.00)
MUTUALS, NUM (0.00)
OPTIONS, NUM (0.00)
IRAS, NUM (200.00)
OCA, NUM (0.00)
HOME, NUM (110000.00)
HOMEC, NUM (50000.00)
AUTO, NUM (30000.00)
JEWELRY, NUM (0.00)
ART, NUM (0.00)
ANTIQUES, NUM (0.00)
PROPERTY, NUM (0.00)
OFA, NUM (0.00)
CHGACCTS, NUM (1300.00)
MORTGAGE, NUM (10500.00)
AUTOLOAN, NUM (3000.00)
EDUCLOAN, NUM (0.00)
OTHLIAB, NUM (0.00)
NW, NUM (58.400)
WAGESELF, NUM (1500.00)
WAGESP, NUM (1900.00)
INTEREST, NUM (0.00)
DIVIDEND, NUM (0.00)
RENTAL, NUM (0.00)
MISCINC, NUM (0.00)
UTILITY, NUM (200.00)
INSUR, NUM (100.00)
MEDICAL, NUM (400.00)
GROCERY, NUM (600.00)
HOUSEHLD, NUM (0.00)
OGL, NUM (0.00)
MORTINT, NUM (1500.000)
OTHINT, NUM (0.0)
FEDERAL, NUM (200.00)
FICA, NUM (100.00)
PROPTX, NUM (0.00)
OTHTX, NUM (0.0)
MISCEXP, NUM (100.00)
MORTPRIN, NUM (25.00)
OTHPRIN, NUM (22.00)
OTHASSET, NUM (500.00)

If this seems long and drawn out bear with me. These tables are used as the data sets for a Financial Advisor program. Using the data in parenthesis above for "Rachel Ruush" this expert system made the following recommendations during a financial consultation:

1- If your current interest rate exceeds 14%, then you can probably benefit from refinancing your mortgage to a more competitive rate. The current rates are closer to 11.5%.

2- You have IRA savings of less than $2000. This is clearly not using IRAs to the extent possible. Money should be put into an IRA, generally even if one has to borrow to do so.

3- You are currently not married. Getting married can save on your taxes. (Your Mother asked me to mention this...)NOTE: The data shows a conflict here with a single person showing a spouses income.

4- Your mortgage payments are equal to 45% of your total monthly income. Experts generally agree that housing should not exceed 28% of your total income.

5- You currently indicate some IRA savings. Be sure that none of the IRA investments currently used have a tax exempt status. The market values of these instruments are higher

Guru IBM Program on page 202

continued on page 207

Guru programs continued

PLOT LABELED % PIE FROM #B4 EXPLODING 2

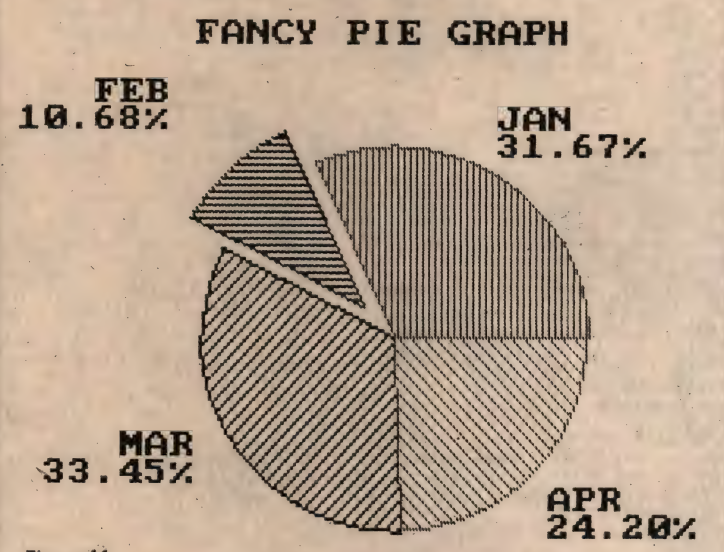


Figure 11

PLOT AREA FROM #A9 TO #D15

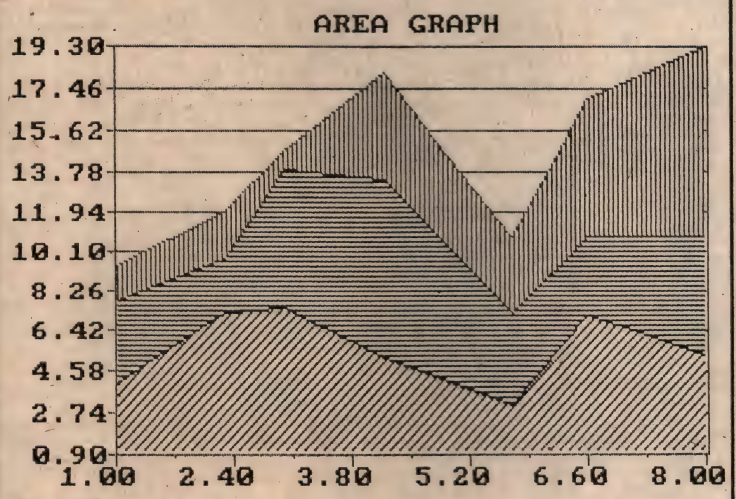


Figure 12

PLOT STACKED BAR FROM #A1 TO #D4

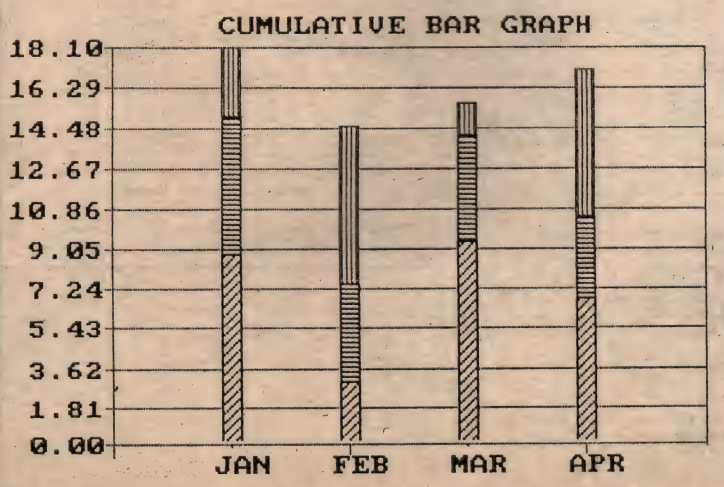


Figure 13

Guru IBM
TABLE: Finance RSS

```
/*  FINANCE.RSS          This rule set determines how much money an      */
/*                        investment client should invest in various     */
/*                        investments.  This rule set also checks various */
/*                        aspects of an individuals financial picture    */
/*                        against normal averages and provides certain   */
/*                        advice.                                        */

INITIAL:
 clear
 at 5, 30 output "Beginning Consultation",
 e.lstr  = 70
 complt  = unknown
 if (currec(investor) ne 0) then
        tage    = investor.age   /* Get age from data table     */
        tmstat  = investor.mstat /* Get mariatal status too     */
 endif

GOAL:    complt

DO:
 clear

RULE:    R1
 PRIORITY: 1
 COST:    1
 IF:      mortint > (0.14*mortgage)/12
 THEN:    perform suggest using 1
 NEEDS:   mortint,mortgage
 REASON:  If the current mortgage interest rate exceeds 14%,
          you can probably benefit from refinancing to the
          current rates of around 11.5 percent
 COMMENT: Check for unaceptable interest rates

RULE:    R2
 PRIORITY: 1
 COST:    1
 IF:      iras < 2000
 THEN:    perform suggest using 2
 NEEDS:   iras
 REASON:  If you have iras less than 2000, then you are clearly not
          using iras to the extent possible.  You should put money
          into an ira, even if you have to borrow to do so!.
 COMMENT: Might even want to check for iras < 4000

RULE:    R3
 PRIORITY: 1
 COST:    1
 IF:      tage > 35 and iras < (tage-32) * 2000 * iraeligible
 THEN:    perform suggest using 3
 NEEDS:   tage, iras, iraeligible
 REASON:  If you are under 35, you have an excuse.  However if you
          are over 35, you really should have been stashing away
          those IRA funds for several years.

RULE:    R4
 PRIORITY: 1
 COST:    1
 IF:      tmstat = "M"
 THEN:    iranum = 2 ; iraeligible = Max(2000, wageself) + Max(2000, wagesp)
 NEEDS:   tmstat,wageself

 CHANGES: iranum
 REASON:  If you are married, you are eligible for two IRA deductions.

RULE:    R5
 PRIORITY: 1
 COST:    1
 IF:      tmstat ne "M"
 THEN:    iranum = 1 ; iraeligible = Max(2000, wageself) + 250
 NEEDS:   tmstat,wageself
 CHANGES: iranum,iraeligible
 REASON:  If you are not married, you are only eligible for one
          ira deduction and an additional $250 for the non-working
          spouse.


RULE:    R6
 PRIORITY: 1
 COST:    1
 IF:      tmstat = "S"
 THEN:    perform suggest using 6
 NEEDS:   tmstat
 REASON:  You can save taxes by getting married.
 COMMENT: Some people may not take this advice

RULE:    R7
 PRIORITY: 1
 COST:    1
 IF:      housing > .28 * totinc
 THEN:    perform suggest using 7
 NEEDS:   housing, totinc
 CHANGES:
 REASON:  The standard rule of thumb says that your housing costs
          should not exceed 28% of you gross monthly income.

RULE:    R8
 PRIORITY: 1
 COST:    1
 IF:      iras > 0
 THEN:    perform suggest using 8
 NEEDS:   iras
 CHANGES:
 REASON:  If this individual is putting money into IRAs, be sure
          he/she is not putting any of the IRA funds into investments
          with any tax deferred status.  The market tends to price
          these investments higher because of the tax deferred status
          which holds no appeal in an IRA.

RULE:    R10
 PRIORITY: 1
 COST:    1
 IF:      othint > 0 or interest > 0
 THEN:    perform suggest using 10
 CHANGES:
 REASON:  One of the best investments you can make is to pay off
          existing debts on which you might be paying substantial
          interest, especially if you have money invested elsewhere
          at a lesser interest rate than you are paying.

RULE:    R11
 PRIORITY: 1
 COST:    1

 IF:      grocery > 0.10 * totinc
 THEN:    perform suggest using 11
 REASON:  If your grocery bill exceeds 10% of your family income,
          then you are spending an excessive portion of your income
          on groceries

RULE:    R12
 PRIORITY: 1
 COST:    1
 IF:      false
 THEN:    complt = true
 COMMENT: This rule is here to make the rule set process
          all of the rules.  It will never fire, but it
          is the only rule which can change the goal.


RULE:    R13
 PRIORITY: 1
 COST:    1
 IF:      netsav < targsav
 THEN:    lowsav = true; perform suggest using 13
 NEEDS:   netsav,targsav
 CHANGES: lowsav
 REASON:  If your net savings are less than your target savings,
          then your savings are too low.
 COMMENT: There might also be variation based upon net income

RULE:    R14
 PRIORITY: 1
 COST:    1
 IF:      housing + othint + othprin > .33 * totinc
 THEN:    totdebt = mortint+mortprin+othint+othprin;
          perform suggest using 14
 NEEDS:   mortint, mortprin, othint, othprin, totinc
 CHANGES:
 REASON:  The standard rule of thumb says that your total debt
          and housing payments should not exceed 33% of you gross
          monthly income.

RULE:    R18
 PRIORITY: 1
 COST:    1
 IF:      mtax ge 38
 THEN:    perform suggest using 18
 NEEDS:   mtax
 REASON:  If you are in a high tax brackets, you can benefit
          from tax exempt securities.


/********
*
* The Following Rules are used to establish the target savings level
* for this investor.
*
********/

RULE:    R30
 PRIORITY: 1
 COST:    1
 IF:      tage < 22
 THEN:    targsav = 0

 CHANGES: targsav
 REASON:  If you are under 22 years of age, you are probably
          using your money for college or just earning enough
          to get by.  Your target savings therefore are 0.

RULE:    R31
 PRIORITY: 1
 COST:    1
 IF:      tage >= 22 and tage < 30
 THEN:    targsav = 0.05 * totinc
 CHANGES: targsav
 REASON:  If you are in your twenties and out of college you
          should be saving at least 5% of your family net income,
          otherwise your savings are too low.

RULE:    R32
 PRIORITY: 1
 COST:    1
 IF:      tage >= 30 and tage < 40
 THEN:    targsav = 0.06 * totinc
 CHANGES: targsav
 REASON:  If you are in your thirties, you should be saving at
          least 6% of your family net income, otherwise your
          savings are too low.

RULE:    R33
 PRIORITY: 1
 COST:    1
 IF:      tage >= 40 and tage < 50
 THEN:    targsav = 0.08 * totinc
 CHANGES:        targsav
 REASON:  If you are in your fourties, you should be saving at least
          8% of your family net income, otherwise your savings are
          too low.

RULE:    R34
 PRIORITY: 1
 COST:    1
 IF:      tage >= 50 and tage < 65
 THEN:    targsav = 0.09 * totinc
 CHANGES: targsav
 REASON:  If you are in your fifties, you should be saving at least
          9% of your family net income, otherwise your savings are
          too low.

RULE:    R35
 PRIORITY: 1
 COST:    1
 IF:      tage >= 65
 THEN:    targsav = 0
 CHANGES: targsav
 REASON:  If you are retired, it is intended that you live off
          your savings, hence target savings are 0


/********
*
* The Following Rules are used to establish this investors marginal
* tax bracket
*
********/

RULE:    R50
 PRIORITY: 1
 COST:    1
 IF:      investor.fstat eq "J"
 THEN:    perform margtax using "joint"
 CHANGES: mtax

RULE:    R51
 PRIORITY: 1
 COST:    1
 IF:      investor.fstat eq "S"
 THEN:    perform margtax using "single"
 CHANGES: mtax
```

table continued on page 207

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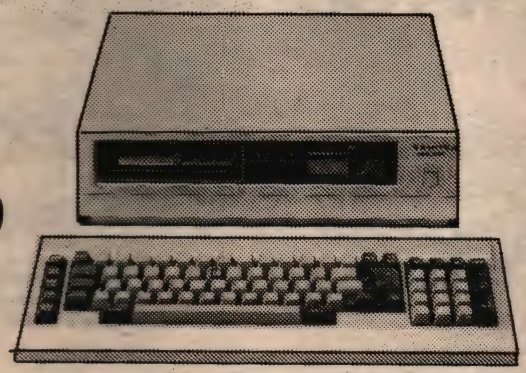
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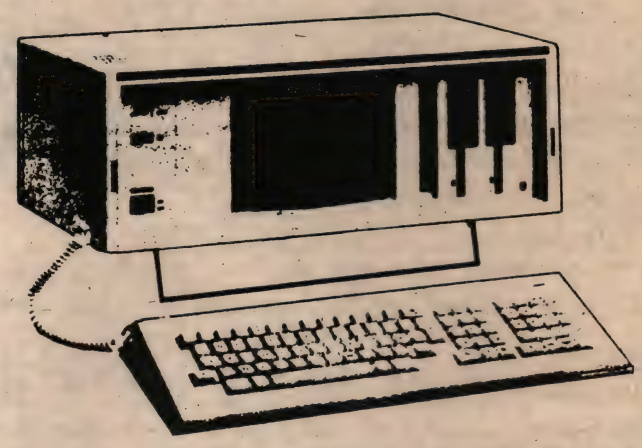
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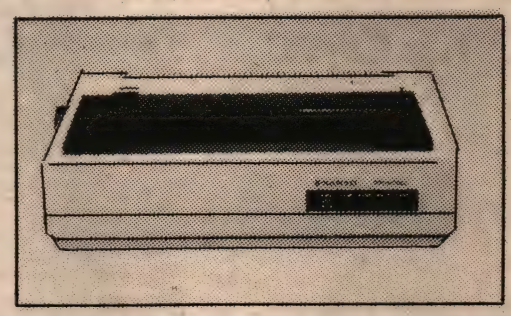


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Hero 2000 continued from page 91

three comprehensive educational courses: *Intelligent Machines, Electronics for Automation, and HERO 2000 Programming and Interfacing.* Each course includes experiment parts and programs to be run on the robot.

"We have designed a total automation learning system built around the ultimate training robot," Johnson said. "Hobbyists, students and trainees will find that the more they learn, the more practical HERO 2000 becomes."

The HERO 2000 automation trainer is available in assembled or in build-it-yourself kit form.

Heathkit/Zenith Educational Systems is a division of Heath Company, St. Joseph, Michigan. Heath is a major manufacturer of do-it-yourself electronic kits. Heath Company is a subsidiary of Zenith Electronics Corporation, Glenview, Illinios.

An interview with Jim Lytle, Product Line Manager, Heathkit/Zenith Educational Systems.

Q: There seems to be a proliferation of robots on the market today. Are there any broad categories by which we can classify robots, and, if so, to which category does HERO 2000 belong?

A: Almost all robots on the market can be placed into one of three categories. The first category is what we call personal robots. Most of these are really little more than programmable toys. HERO 2000 is definitely not a personal robot.

Another category is industrial robots. There are thousands of these robots working today in American Industry. They can be very complex, can cost a million dollars or more, and generally are designed to perform specific manufacturing or testing functions.

The third category is the educational or training robot...and that's where HERO 2000 belongs. And compared to other training robots, HERO 2000 is in a class by itself. It can do more, and do it faster, more efficiently, and more accurately than any other training robot currently on the market.

Q: What is the primary difference between HERO 2000 and a personal robot?

A: The primary difference lies in what the robot is designed to do. HERO 2000 is designed to teach, and to motivate by making learning fun. Personal robots, regardless of complexity, are still, for all practical purposes, programmable toys. They perform pre-programmed functions such as singing songs, telling stories, carrying small objects.

Now, while HERO 2000 can do all these things—talk, sing, write his name—even sneeze—it is primarily a learning system for automation and robotics.

Q: How would HERO 2000 compare to an industrial robot?

A: Industrial robots are designed to perform specific manufacturing or testing functions involving high speed and tight tolerances. They are generally big, heavy and expensive.

By contrast, HERO 2000 was designed to teach workers and students the concepts of automation that make those industrial robots work. HERO 2000 is neither as fast as or as accurate as the typical industrial robot—but it is a lot more flexible and smarter.

Q: What is it that makes HERO 2000 an educational training robot?

A: HERO 2000 is the centerpiece of a comprehensive automation learning system. The robot is an essential part of that system, but there is much more. Three courses have been designed to teach every concept of automation now used in industry. And the trainer—HERO 2000—allows the student/trainee to perform practical demonstrations of these concepts. HERO 2000 turns theory into practice.

continued on page 211

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Guru Integrated Software continued from page 201

while they have no advantage for a tax exempt fund such as an IRA. They should not be part of an IRA portfolio.

6- Groceries for the normal family, should not exceed 10 percent of their income. This family spends approximately 18%.

7- The standard rule of thumb says that your total dept and housing payments should not exceed 33% of your total income. Your ratio is 46%.

8- Based on your age, you should be saving $170. per month, but your net cash flow per month is $-347.00.

All this from the data entry in the files listed above! GURU also will produce a balance sheet, monthly income statement and an investor profile printout, with some help from a RULES SET (see Table-FINANCE.RSS). The rules look as if they could choke a horse but with a little practice using the rules generator (again it is menu driven) you will be producing rule sets to serve as your expert advisor as you need them. Each rule has a priority to place its importance.

The cost is a measure of the speed of a rule. Simple statements run faster than longer more complex statements. The "IF" and "THEN" statements should be a familiar part of most operators vocabulary. The "NEEDS" tell the program what fields have to be consulted. The "REASON" is a statement in plain English as to what the rule does and should follow the same format as the "IF-THEN" statement. This is displayed to the advisee during questioning.

The interaction of the elements of GURU will amaze you as you become familiar with its operation. It is so easy to use data from one element in another that you will do it without thinking as you develop your applications. Again I have to say that it will take a while to get to know GURU but it will definitely be worth the time and effort.

GURU has a complete security system built in to allow different levels of access for different operators. This system uses passwords, read-and-write access clearance, data encryption and procedure scrambling. This security limitation can be for all or any part of a GURU system.

An optional library of C language functions is available for advance developers. These allow GURU data tables to be accessed from within C programs. These programs can be executed by GURU or from the DOS. Run-time versions of GURU are available so application systems can be distributed.

MDBS provides support services for their software that include Regional Training Seminars, On-Site Training, Priority Support for Subscribers, Consulting and Application Development Services. This is about all the support you would ever need and then some. They have offices in Lafayette IN, Dallas TX, New York NY and Chicago, IL.

The final word is that there is no final word! GURU goes on and on as far as you want to go. I like it more than I thought possible. The only draw back is the cost for an individual user like me without a corporate or business expense account to fall back on. I will hate to turn the package back to the *Computer Shopper* when this is through. I could be very happy using GURU for a long time. The program runs without a glitch that I could find and believe me I tried! The documentation is a work of art. As you use the program you will progress through the Menu User's Guide to the Command Users' Guide and use the two Reference Manuals as you go. Slowly they will be relegated to the shelf and there will just be you .. and GURU.

GURU
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For more information contact Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN 47902. (317) 463-2581. ●

More Sanyo Software continued from page 195

myself. Check your manual on how to use EDLIN to create an autoexec.bat file. If the manual is not clear, and you need help, write me at: P.O. Box F, Titusville, FL 32781. If the response warrants it, I'll include a brief tutorial in a future column.

From DOS, type CALENDAR and you're ready to work. I strongly advise you not to bypass the date, as Calendar reads the system date to open with the month corresponding to that date.

A split screen appears. On the left is a calendar of the month, and on the right is an area for messages. One of the function keys allows for the transition from one screen to the other. There is no need to detail which key does what since it is always on the screen, and besides, that would be too boring to start listing anyway.

Follow the directions now. Use the arrow keys to move around the dates of the month. As you go through different dates, highlighting occurs. You can go through other months, pick a date to scan for messages, and more. I saw no means of jumping years at a time other than by picking a date.

When you do pick a date, the program checks memory or the disk for anything stored for that date. Since I did not do extensive testing, I had the impression that the information was loaded into memory when the program was loaded, thus speeding up the search. In fact, if you go to a date on the monthly calendar and hit the Return key, the information, notes, and appointments stored for that day appear on the right side of the screen in the notepad area. If there is none, hitting Return will activate the notepad for the date on the left where the cursor resides. Enter your message; it is saved automatically when you switch back to the calendar portion.

The message area itself allows the usual full-screen editing one would expect from a primitive word processor, at least, including inserting and deleting. However, there is no automatic wordwrap, so you must plan the end of each line if you plan long or detailed messages, and hit Return at the end of each. It would appear that you can get only one small page of messages in per date, thus limiting the utility of this program somewhat.

There was also a supplementary program called Caldata for manipulating the data saved, but frankly, it seemed inefficient in the way it worked with just one line of text at a time. Thus, I stuck to the basic calendar program.

Summary

If a computer-based reminder system for your Sanyo 55x strikes your fancy, and you don't have an excessive amount of information to store per day, the Calendar can be a worthwhile purchase at $24.95, plus $3 shipping and handling. I personally would have liked it larger and memory-resident. Of course, this would have made memory demands so that those of you with barebones, 128K systems, could not use it.

Again, it all boils down to your style. I would say that this program can be of value if you are not currently using a computer-based program for your Sanyo, would like to, and would use the program regularly, subject to the limitations I've described. The program is quick, reasonably priced and a good value.

MichTron, 576 South Telegraph, Pontiac, MI 48053; (313) 334-5700. ●

Integrated Software Finance Table continued from page 202

```
RULE:     R52
 PRIORITY: 1
 COST:     1
 IF:       investor.fstat eq "I"
 THEN:     perform margtax using "indiv"
 CHANGES:  mtax.

RULE:     R53
 PRIORITY: 1
 COST:     1
 IF:       investor.fstat eq "H"
 THEN:     perform margtax using "headofh"
 CHANGES:  mtax

/*********
*
* The following variables section is used to prompt for variables which
* might not be known.  If the user has identified an investor and loaded
* their pro-forma financial information into the spreadsheet prior to
* consultation of the rule set, none of these variable declarations are
* necessary.  If the consultation is invoked prior to identifying an
* individual, or directly from interactive GURU, this section is used.
*
*********/
VAR:      IRAS
 FIND:    input iras num with "How much money does this individual have invested i
n IRAs:"
 LABEL:   Amount currently invested in iras

VAR:      MORTPRIN
 FIND:    input mortprin num with "Current Mortgage principle payments:"
 LABEL:   Current mortgage principle payments/period

VAR:      MORTINT
 FIND:    input mortint num with "Current Mortgage interest payments:"
 LABEL:   Current mortgage interest payments/period

VAR:      OTHPRIN
 FIND:    input othprin num with "Current Non-Mortgage principle payments/period:"
 LABEL:   Current non-mortgage principle payments/period

VAR:      OTHINT
 FIND:    input othint num with "Current Non-Mortgage interest payments/period:"
 LABEL:   Current non-mortgage interest payments/period

VAR:      WAGESELF
 FIND:    input wageself num with "Current Wages for this individual"
 LABEL:   Wages for this individual

VAR:      WAGESP
 FIND:    input wagesp num with "Current Wages for spouse"
 LABEL:   Wages for individuals spouse

VAR:      GROCERY
 FIND:    input grocery num with "Enter approximate grocery expenditures for this
period"
 LABEL:   Amount spent for groceries per period

VAR:      TAGE
 FIND:    input age num with "Enter individuals age"
 LABEL:   This individuals age

VAR:      TMSTAT
 LABEL:   Marital status
 FIND:    input tmstat using "u" with "Enter Married or Single (M/S):"

VAR:      HOUSING
 LABEL:   Housing expense
 FIND:    housing = mortint + mortprin
END:
```

Macintosh Color Graphics continued from page 70

without requiring knowledge of graphics programming.

"Cricket Graph has been enthusiastically accepted by First Boston and other beta testers. With its ability to import science and business graphics images directly to desktop publishing-created documents and print color graphics at higher-than-Macintosh resolution on plotters and printers, Cricket Graph now gives Macintosh users the ability to create sophisticated professional color presentations and documents at a fraction of the cost and with full individual control."

Availability and Price

Cricket Graph is now available, with a suggested retail price of $195. Versions for film recorders and color printers are priced at $495 each. A demo disk is available for $6.95. Cricket Graph is not copy-protected. It requires a Macintosh 512K computer with two disk drives or one double-sided disk drive. For further information, contact: Cricket Software, 3508 Market Steet, Suite 206, Philadelphia, PA 19104, (800) 345-8112 or (215) 387-7955.

Mention that you read about in in *Computer Shopper*. ●

Mac Universe continued from page 69

is selling a tremendous number of machines per month. Estimates range from 25,000 to 30,000 units per month. This is compared to 10,000 units per month for the Mac 512. Frankly, I wonder about this. If this is true, then why are dealers dropping the Macintosh? The most recent defection was Sear's Computer centers. I cannot believe if Sears had noticed an upturn in the past three months, they would quit carrying the unit. Likewise, I recently attended the St. Lous Computer & Business Equipment Showcase (sponsored by the same people that put on Comdex and the West Coast Computer Faire). With more than 50 distributors, I saw only four Macs and two of them were from software stores demonstrating game software. The rest of the distributors were showing IBM and IBM clones.

Lower Prices For Jazz

According to an article in the *New York Times*, Lotus Development Corporation will shortly be lowering the price of Jazz from $595 to $395. This is being done in an attempt to revive stagnating sales. (According to my local dealers Excel is heavily outselling it). Also planned are various discounts for college students and dealers.

As a practical matter, the street price of Jazz should sink to around $200 - $250. At that price it is almost worthwhile to get.

Mac + Incompatibility

The more I use a Mac + the more disappointed I am. All the publicity aside, it is not a revolutionary machine. First, the new keyboard is driving me bananas. It has a completely different fee. For example, the option key on the Mac + keyboard is twice the size of the old keyboard and directly underneath the shift key. If I forget to lift my hands up (I can no longer rest my palms on the bottom of the keyboard) the option key is activated and the option characters are typed. In the same genre, the integrated numeric keypad is not interfaced with the option key. For example, option 7 using the seven above the letters produces a " " while an option 7 using the numeric keypad scrolls the video screen up a line. Likewise the enter key has been removed to the far right of the keyboard and placed with the numeric keypad. This means you have to lift your hand off the keyboard to strike it. This is very aggravating with those programs that extensively use the enter key.

The new disk drives are also aggravating. Since I only have one 800K drive (the internal), I have to be sure to not put an 800K formatted disk into the 400K external. If I do, it tells me the disk is unreadable and asks if I want to format it. More than once, I wiped out a 800K data disk.

Software compatibility is not all that great either. So far I have found the following incompatibilities:

1. MS Basic 2.1 hangs up if a single voice sound is used. To get around this, the multivoice sound must be used. Also, when you hit RETURN to terminate a BASIC INPUT statement, you get an extra linefeed. This forces any subsequent PRINT or INPUT statement output one line down from normal.

2. My Disk Labeler: After printing a label, error bomb ID-02 appears and the program locks up.

3. Fokker Triplane: The help menu is supposed to retrieve the scrapbook DA but it will retrieve all other DAs first.

4. Copy II Mac & Mactools: both are incompatible with double-sided disks. I also think Mactools is not HFS compatible.

5. Mac Vegas: Does not boot at all.

6. Thinktank 512, Version 1.20: Is incompatible with Finder 5.1 and the heirarchal file system. It works on the 512 if the Finder 4.1 is used.

7. Any program that does disk or file editing (e.g. Resource Editor, Fedit, Edit) will not work on an 800K drive. You must do the editing on a file located on a 400K drive and copy the file over to the 800K drive.

8. Finally, I am plagued by random bugs. Programs that I know work on a 512K Mac under Finder 4.1 do not always work on the Mac + using Finder 5.1 and 5.2 (5.2 is the newest and is designed to replace a number of bugs in 5.1). I cannot place my finger on the exact key sequences, but I am very careful to have backups of all my important files.

Compuserve Programs

This month I have only one progam to mention; INFO.BIN. This is a neat little program that gives the user direct access to the time, date and volume settings via a pull-down menu. Once it has been installed INFO.BIN can be used from any application. Just click anywhere in the menu bar and the menu option Info will appear. Pulling it down shows the current time, date and volume level setting. You may choose any item in the menu but only "Volume = X" has any response. When the mouse button is released the current volume level will be incremented by one and sound off. If the level is currently seven, the volume will wrap around back to zero. The current volume will be shown the next time you pull down the Info menu. The adjustment is permanent (parameter ram).

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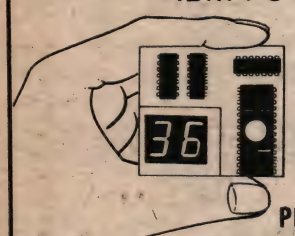
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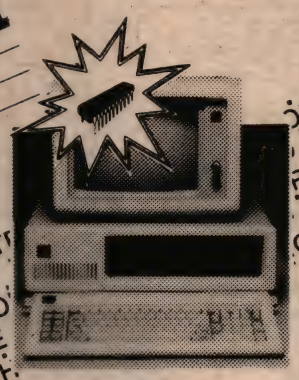
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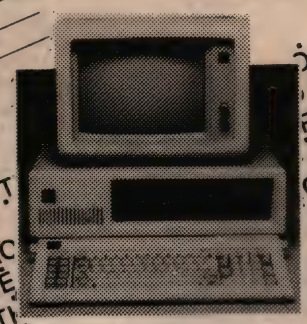
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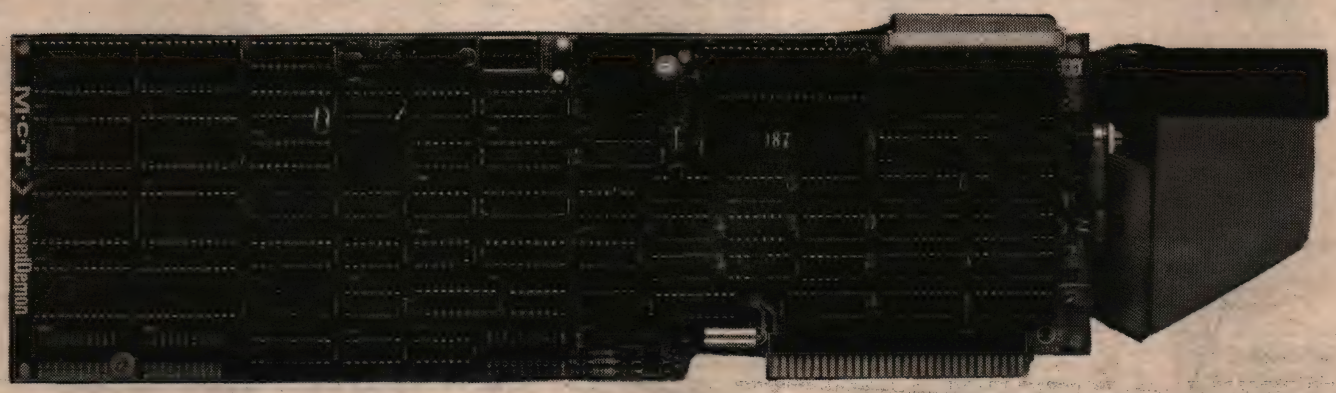
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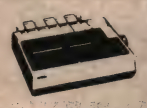
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Hero 2000
continued from page 206

Q: How does the student or trainee perform experiments with the robot?
A: The robot allows the operator to see how a particular concept of automation is put to practical use. The operator can program HERO 2000 to accomplish specific tasks. And in the experiments that are part of the educational courses, the student builds circuits on solderless breadboards that can then be tested on HERO 2000. The potential applications of the robot are almost endless.

HERO 2000 can also interface with any home computer that has an RS-232C port.

But remember, HERO 2000 is already a computer...with a powerful 16-bit processor. Add the optional disk drive and you have a bonafide 16-bit disk-based computer on wheels that can be interfaced with printers, plotters, modems and monitors.

Q: Are accessories available to expand HERO 2000's capabilities?
A: Oh, yes. HERO 2000's RAM can be expanded to well over half a megabyte with three optional memory boards. And, as mentioned, an optional disk drive assembly will be available later this year, along with an Auto-Docking System.

And Heathkit/Zenith is also actively encouraging third-party suppliers to develop software and hardware for HERO 2000, just as we did for our first two robots, HERO 1 and HERO JR.

Q: That Auto-Docking System you mentioned sounds interesting. Could you tell us how it works?
A: The Auto-Docking System allows HERO 2000 to function autonomously. When the robot senses that its battery is running low, it seeks out its charger by locating and homing in on the Auto-Docking System. Once the robot has located its charger, it goes to it, lines up with it, and connects to it so the charging procedure can begin.

Q: How does HERO 2000 compare with other educational robots and learning systems currently on the market?
A: HERO 2000 is the most complete and cost-effective automation learning system on the market today. No other educational robot can match it for educational impact. It teaches all the important concepts of automation, not just robotics. These include such important automation concepts as artificial intelligence, process control, CAD-CAM, the automated factory and the interfacing of computers with machines.

Q: How will buyers use HERO 2000?
A: Some individuals will buy HERO 2000 to learn new skills to make themselves more employable or to advance in their present jobs. And some will buy it because of a fascination with electronics, machinery and robots.

A second group of buyers will be schools. The automation learning system will be used to train students who are seeking marketable job skills.

The third group will be industrial trainers. The HERO 2000 automation learning system is the safest, most cost-effective system available for training workers today. Industry has a growing need for workers who understand the basic concepts of automation, and HERO 2000 will play an important role in helping fill that need.

Q: Have the needs of industrial trainers been considered in the development of the HERO 2000?
A: Yes. First, HERO 2000 is designed to teach concepts, not specific job skills. With solid understanding of the concepts of automation, today's industrial workers will find it much easier to adjust to modern manufacturing systems.

Second, HERO 2000 costs a lot less than most industrial robots and, therefore, is a cost-effective alternative to using actual industrial robots for training purposes. It can be pretty expensive to take an industrial robot out of production to use it for training purposes.

Third, HERO 2000 is a safe, forgiving trainer that anyone can use.

And last of all, HERO 2000 is a complete automation learning system. The teaching methods employed in our courses are proven effective. Heathkit/Zenith Educational Systems is widely considered to be one of the world's leading developers of technical educational material for individuals, schools, industry and government.

Q: In closing, could you give us your opinion of what kinds of robots we can look for during the next decade?
A: Well, I suppose there will be a lot more so called personal robots coming into the consumer market. But I wouldn't hold my breath waiting for one that can wash dishes, change the baby and do windows nearly as well as humans. That's a long way off.

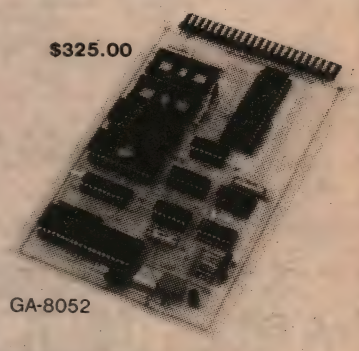
But we will see substantial growth in the use of industrial

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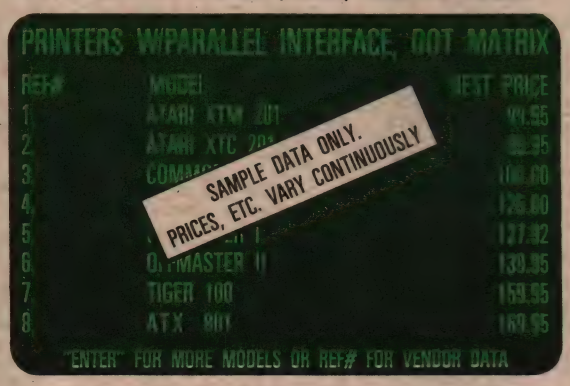
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TI Forum
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77511. When these programs reside in the module, loading time is cut down drastically due to the speed of RAM access (and the slowness of disk access).

Super Space is Super Cart with the whistles and bells of documentation and the extra disk included; both are worthy of consideration if you are interested in the capabilities of a "super module." The module, disk and manual sells for $49.95, assembled. The kit is available for $42.95 and the disk and manual alone are $14.95. DataBioTics, distributor of Super Space, can be contacted at P.O. Box 1194, Palos Verdes Estates, CA 90274.

Fair-O-Mania

If anyone ever wondered if the TI user community was still a viable commercial market, those questions have been answered of late. The Los Angeles "Fest-West" (held March 1 and 2) and the "Texas Instruments Computer Owners Fun Fest," held in New Jersey (March 15) were both raging successes. With over 1500 attending the LA event and over 1000 attending in New Jersey, the two fairs showed clearly that TI users are still an active bunch. Further, the commercial exhibitors at these Fairs can testify that TI owners are quite willing to spend dollars for new equipment and hardware. And they were given the opportunity at both events to see and buy some exciting new products. Two more fairs were announced and include Boston (April 5), Ontario, Canada (April 26) and Nashville (May 3-4). We will have reports of these events in future issues.

At Los Angeles, Millers Graphics introduced a two-part project that will enable, first, the use of a full-sized IBM-like keyboard with their TI and, second, will allow a 32K memory for the use of keyboard macros. This development will allow for the use of single keystroke to perform a multitude of user-programmed functions and will work, reportedly, with all existing TI software. The device will be a PBox card that will allow a variety of full-sized keyboards to be hooked up to it. The /4a console will still be used for its module port, and the PBox will be attached to the original console. The card will retail for somewhere near $100 and the user will purchase his own keyboard separately. Also announced by MG at the LA Fest was "DISKASSEMBLER," a new software product that will allow the disassembling of any assembly langauge program (including memory image files) into source code. Unlike previous disassemblers, the software will produce true source code for programs on disk that can be re-assembled or modified. The program is immediately available for $19.95 + $2.00 SH. Write to Millers Graphics for details (1475 W. Cypress Ave., San Dimas, CA 91773).

Also shown at the Fest-West was a new product line from Germany's Mechatronics that will be marketed in the states by Douglas Morgan (7655

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Hero 2000
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robots in manufacturing plants all over the world, and with this growth, a corresponding increase in the need for industrial workers who understand, and are comfortable with, the kinds of equipment used in automated factories. Automation is the key to survival in manufacturing—and industrial robots are an integral part of every automated factory.

According to industry sources, there currently is a need for over 40,000 workers trained in robotics and automation. By the year 2000, that number will increase to well over 1,000,000.

This is the real reason HERO 2000 was built. During the next decade, HERO 2000 will play a major role in training the workers that industry needs to increase productivity and efficiency, and thereby remain competitive in the world market.

For additional information contact Heath Company, Department 570-506, St. Joseph, MI 49085; (616) 982-3210. ●

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Hacking Atari ST continued from page 73

when I want to use Mince to edit a file named ART.APR, I type the following at the system prompt:

MINCE ART.APR <cr>

That way, the editor loads into memory, and it automatically loads the file ART.APR into memory. The desk top used on the ST uses a graphics interface, you load a program by double clicking your mouse on it, so you have no chance to type in command line arguments. Since command line arguments are so useful, the ST provides the alert box for command line arguments for the programs that use it.

It just so happens that there is a version of Mince that runs on the ST, so of course, I use it for text editing with the ST. On the ST I double click on MINCE.TTP, and the alert box appears. I can then type ART.APR and press the return key and viola, MINCE is loaded into the machine and it loads the file ART.APR.

When you use the install application option, you tell the computer which kind of environment to prepare for the program. The information is saved on the disk and is used by the computer when it tries to load a program.

I like to change the extent of the program instead of installing it. That way, when you copy the program onto another disk, the computer knows what kind of environment to prepare without you having to install the application on the new disk.

Since I believe one of the best ways to learn things is to roll up your sleeves and get your hands dirty, I have provided a simple program that you can change the extent of to see how it effects the display. The program is on a disk, along with several other small useful programs for the ST. I will tell you how to get the disk a little later in this column. If you don't want to order the disk, you can use any program that does not use the mouse for interfacing. The program itself is:

```
-include <stdio.h>
-include <osbind.h>

main()
printf("/n/n/n/nThis is a demo.
/n"); delay(1000);
}
```

Compile the program and run it with an extent of .PRG. Change the extent with the SHOW INFORMATION option to .TOS and run it again. Change the extent to .TTP and run it one more time.

The AUTO folder is a special folder that can appear on ST disks. The reason the AUTO folder is special is that any program that appears in the AUTO folder is executed right after booting, before you get to the desk top. The AUTO folder can be used to run small customizing programs that you always want executed. Most of my friends have a RAM DISK program in the AUTO folder of their boot disk. I also have several small programs that I normally keep in my AUTO folder.

The first program I'd like to go over is one that I should have written a year ago, but didn't get around to writing until the first of this year. I have a Volksmodem 12 smart modem hooked up to my ST. I tend to forget to turn it off when I am done using it, so people that call me are often greeted with an ear-shattering shrill. The modem will answer the phone right after the first ring, so I don't have a chance to turn it off before it mounts its attack on my friends. The solution is a small program in the AUTO folder.

NOTONE.PRG is a small program using the Bconout function that was covered in last month's article to perform a useful function. Demonstration programs are always so much nicer when they do something useful! Hayes compatible smart modems can be commanded to not answer the phone by sending them the string "AT S0 = 0<cr>". By putting a program in the AUTO folder that sends this string to the modem, you set the modem to never answer the phone every time you boot your computer.

Before we get into the program itself, I will need to go over the Rsconf() extended bios call. The Rsconf call is used to configure the serial port on the ST. The call takes 6 parameters! The first parameter is the baud rate. The ST can run at any of 16 baud rates. The codes used for baud rate settings appear in Table I.

Baud rate	Rsconf code
19200	0
9600	1
4800	2
3600	3
2400	4
2000	5
1800	6
1200	7
600	8
300	9
200	10
150	11
134	12
110	13
75	14
50	15

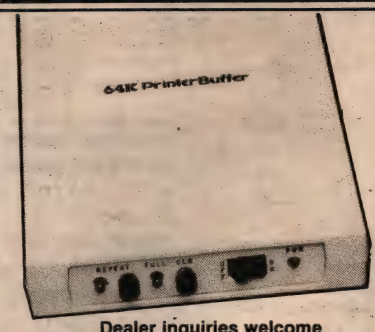
Table I

Baud rate codes for the Rsconf() call.

The second parameter used determines the flow control used. There are four flow control settings; 0—No flow control; 1—Xon/Xoff; 2—RTS/

continued on page 216

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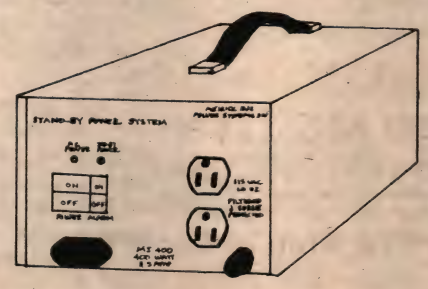
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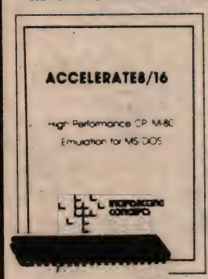
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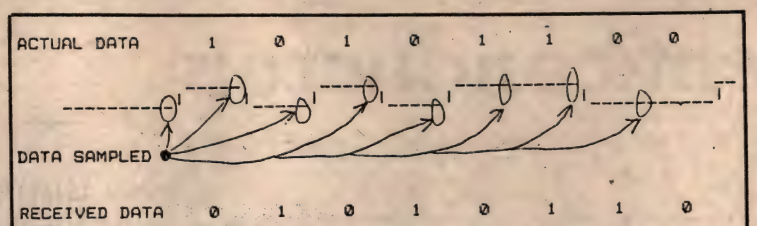
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Hacking Atari ST

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CTS; 3—Xon/Xoff and RTS/CTS. The flow control determines when (if ever) the serial transmission of data is inhibited. Xon/Xoff are two character (Control S and Control Q) that can be used to control transmission of serial data. If the ST is set up for Xon/Xoff flow control, when the ST receives a Control Q from whatever it is talking to, it will stop sending data until it receives a Control S. Some printers that use a serial interface use the Xon/Xoff protocol to control the computer.



Bad data as a result of clock skew.

Figure 1.

Most printers that use a serial interface use the RTS/CTS lines of the RS-232C connector to tell the computer when the printer is busy, and can't receive any more characters.

If you are hooking a modem to the serial port, you should use the No flow control option.

After the baud rate and flow control parameters, the next four parameters are values that set registers in the MFP 68901. The MFP 68901 is a complex chip that performs many functins within the ST. I will be covering sections of the 68901 in several columns because it is just too complex to cover in a single column.

The four parameters are used to set the value of the ucr, rsr, tsr, and the scr. The ucr is the USART control register. This is an 8 bit register controls the clock mode, the word length, the start and stop bit configuration and parity. The register layout is shown in Table II.

BIT #	FUNCTION	ACTION
7	clock mode	/1 or /16
6	word length	
5	word length	5,6,7 or 8 data bits
4	stop/start bits	0 or 1 start bit
3	stop/start bits	0,1,1 & 1/2 or 2 stop bits
2	parity enable	
1	even/odd parity	selects even or odd parity
0	not used	

Table II
UCR register bits

Bit 7 (The most significant bit) controls the divisor ratio for the clock signals for the transmitter and receiver sections of the 68901. If bit 7 is a 0, then the data is clocked into the receiver and out of the transmitter at the clock rate. When bit 7 is a 1, then the data is clocked into and out of the 68901 at 1/16 of the clock rate.

You may be wondering why you would want to use a clock frequency 16 times higher than the data transmission rate. When the higher clock frequency is used, the receiving portion of the USART part of the 68901 can be a little more sophisticated.

With a divide by 1 clock, the USART looks at the data on the rising edge of the clock pulse. If the clock is a little out of sync, you can receive bad data. Since the data is sampled only once at the leading edge of the clock, external circuitry must synchronize the receive clock to the clock being used by the transmitter.

If for some reason the receiving clock gets a little out of sync with the transmitting clock, you get a whole string of bad data until the external circuitry can get the clocks resynchronized. See Figure 1.

When the divide by 16 option is being used, the USART will start counting as soon as it detects an edge. Four clock pulses after the edge, the data line is sampled. In addition to more reliable data sampling, the divide by 16 mode allows the USART to tolerate some "jitter" in the data without getting messed up. When the data

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Hacking Atari ST
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line changes state, the counter is reset to 0. That way, if one of the data pulses is only 14 clocks long, the USART will resynchronize on the next data transition by resetting to 0 even though it had only counted to 13. (Computer scientists always count from 0)

Bits 6 and 5 control the number of data bits. Unlike some other USARTs, the 68901 will never transmit less than 8 bits. If you request 5 bits, the 68901 will send 5 data bits and 3 0s to bring the total to 8 data bits. The settings of bits 6 and 5 to use are:

Bit 6	Bit 5	Length (active data bits)
0	0	8
0	1	7
1	0	6
1	1	5

Bits 4 and 3 are used together to control the number of start and stop bits. The values of these bits are:

Bit 4	Bit 3	Stop	Start
0	0	0	0
0	1	1	1
1	0	1½	1
1	1	2	1

Bit 2 is the parity enable bit. If this bit is 0, then the 68901 will not add a parity bit to the data, it also does not check the parity of the received data. When bit 2 is a 1, the USART checks the parity of each received character and it will also add a parity bit to each data word transmitted.

Bit 1 is the parity bit. If bit 2 is a 0, then this bit does not control anything. If bit 2 is a 1, then bit 1 selects even or odd parity. When bit 1 is 0, then the 68901 uses odd parity. When bit 1 is a 1, even parity is used. As indicated in Table II, bit 0 is not used.

rsr is the receiver status register. The rsr contains the buffer full bit, the overrun error bit, the parity error bit, the frame error bit, the break detect bit, the match bit, the synchronous strip enable bit, and the receiver enable bit.

Bit 7, the buffer full bit is a 1 when the USART has received a character. Bit 6, the overrun error bit is set to 1 if a new character arrives at the USART before the last character has been read. Bit 5, the parity error bit is set to a 1 if a received character has the wrong parity. Bit 4, the frame error bit is set if a character is received that has no stop bit. Bit 3, the break detect bit is set if a break signal is detected. Bit 2, the match bit is set if the received character matches the character in the synchronous character register. Bit 1, the synchronous strip enable bit controls whether the synchronous character is treated as a normal character or ignored by the USART. When this bit is a 1, the synchronous character is treated like a normal character by the USART. Bit 0, the receiver enable bit controls operation of the receive portion of the USART. When bit 0 is a 1, the USART operates normally. When bit 0 is a 0, the receive portion of the USART is reset. All the status bits are cleared to 0 and the receive portion is disabled.

TSR is the transmit status register. It contains the buffer empty bit, (bit 7) which is set to a 1 when the USART transmit buffer is ready. Bit 6 is the underrun error bit, which is set to a one when if a character is completely transmitted before a new character is loaded into the buffer.

The 68901 uses double buffering the USART section. This means that the 68901 can be processing four characters at a time. The receive buffer can contain a character while the USART is assembling another received character. The transmit section can be transmitting a character using the transmit shift register and also contain a character in the transmit buffer that will be sent as soon as the transmit shift register is empty.

Bit 5 is the auto-turnaround bit. If this bit is set to a 1, the receiver is enabled as soon as the transmitter finishes sending a character.

Bit 4 is the end of transmission bit. If you disable the transmitter, the character in the transmit shift register will continue to send. When it is completely transmitted, bit 4 is set to a 1.

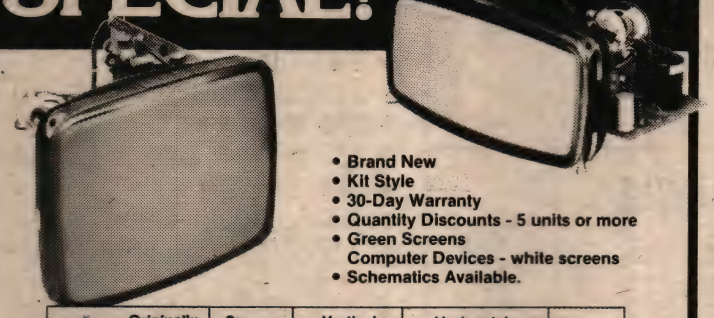
Bit 3 is the break bit. If this bit is set to a 1, then the USART will start sending a break signal. A break is a continuous 0 which is used by some mainframes as a special signal.

Bit 2 is used along with bit 1 to control the state of the transmitter output. They select for high, low, high impedance or loopback modes. When the transmitter section is disabled, the output can be set to high, low or tri-state. You can also enter the loopback mode. Loopback routes the output of the transmitter to the receiver. The settings of bits 2 and 1 are:

Bit 2	Bit 1	Transmitter output
0	0	High impedance
0	1	Logic 0 (Low)
1	0	Logic 1 (High)
1	1	Loopback

Bit 0 is the transmitter
continued on page 219

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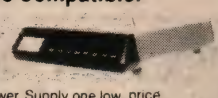
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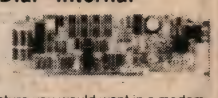
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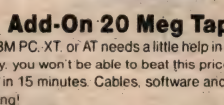
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continued from page 217

enable bit. When it is a 1, the transmitter portion of the USART is operational. Setting this bit to a 0 will disable the transmitter.

The synchronous character register is used to contain a character used by the USART when it is operated in the synchronous mode. Since most everyone will be using the 68901 in the asynchronous mode, I have glossed over the operation of the 68901 in the synchronous mode.

The small amount of information presented here should be enough to tell you that the 68901 is a complex chip. In addition to the USART, it contains parallel I/O, 4 counter/-timers and interrupt generation/control circuits. If you wish to make use of the chip, the Motorola *MC68901 Multi-Function Peripheral* booklet is a must.

Thankfully, most of you can use the Rsconf() call and not worry too much about the internal workings of the chip. If any of the register parameters is a −1, then the Rsconf() call will not alter the register contents, so most of the configuration can be performed by using four −1s as the register parameters. If you need to set the number of data bits, the parity or the number of stop bits, then you will need to pass the correct value for the ucr parameter. The system defaults to 8 data bits, 1 start bit, 1 stop bit and no parity. Since this is the configuration needed for the XMODEM protocol, you will rarely need to alter the ucr setting.

If you do need to manipulate the MFP68901 directly, then you will need the register addresses within the Sts memory map. Be warned that the MMU and GLUE chips consider this area off limits to user programs. To read or write to these addresses you will have to be in the supervisor mode. There are 2 calls that can be used to switch the system to the supervisor state.

The first method (and my favorite) is to use the extended bios call 38. This call is passed the address of a procedure. It will switch to the supervisor state, execute the procedure, switch back to the user mode and then return. I have written a few small routines in assembly language to perform memory reads and writes and these routines can be executed in the supervisor mode to access the MFP 68901. I will be going into more detail on these routines in the next column.

The second method is more trouble, but can be used in several ways. There is a GEMDOS call, number 32, that can be used to switch into supervisor mode. To use the GEMDOS 32 call to switch to the supervisor mode you pass it as long 0, and it will return the old stack pointer. You can then execute code in the supervisor mode. To return to the user mode, call GEMDOS 32 with the old stack pointer value. Like the extended bios call, I'll cover this in more detail in the next column.

The addresses of the 68901 registers are given in Table III.

Remember the program I promised you? It is presented in listing 1. The main body sets up the serial port for 1200 baud operation, then we send the string to the modem that actually commands it to not answer the phone. If the program is left in the AUTO folder, then every time you boot the system, the modem will be commanded to not answer the phone. The msout procedure is used to send a string to the modem. It uses the Bconout function discussed in the last column.

```
gpip = 0xfffa01;    /* 68901 general purpose I/O register */
aer = 0xfffa03;     /* active edge register               */
ddr = 0xfffa05;     /* data direction register            */
iera = 0xfffa07;    /* interrupt enable register a        */
ierb = 0xfffa09;    /* interrupt enable register b        */
ipra = 0xfffa0b;    /* interrupt pending register a       */
iprb = 0xfffa0d;    /* interrupt pending register b       */
isra = 0xfffa0f;    /* interrupt in-service register a    */
isrb = 0xfffa11;    /* interrupt in-service register b    */
imra = 0xfffa13;    /* interrupt mask register a          */
imrb = 0xfffa15;    /* interrupt mask register b          */
vr = 0xfffa17;      /* vector register                    */
tacr = 0xfffa19;    /* timer a control register           */
tbcr = 0xfffa1b;    /* timer b control register           */
tcdcr = 0xfffa1d;   /* timer c and d control register     */
tadr = 0xfffa1f;    /* timer a data register              */
tbdr = 0xfffa21;    /* timer b data register              */
tcdr = 0xfffa23;    /* timer c data register              */
tddr = 0xfffa25;    /* timer d data register              */
scr = 0xfffa27;     /* synchronous character register     */
ucr = 0xfffa29;     /* USART control register             */
rsr = 0xfffa2b;     /* receiver status register           */
tsr = 0xfffa2d;     /* transmitter status register        */
udr = 0xfffa2f;     /* USART data register                */
```

Table III

```
-include <stdio.h>
-include <osbind.h6

main()
{
/*first we set up the serial port
*/Rsconf(7,0,-1,-1,-1,-1);
/*now we wait for everything
to get switched*/delay (250);
/* output the command to keep
```

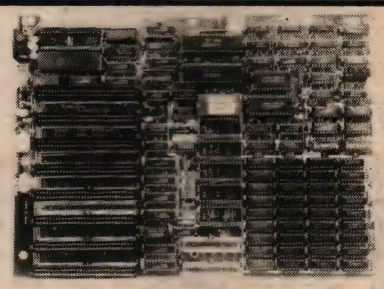
continued on page 221

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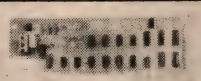
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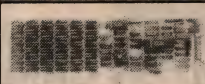
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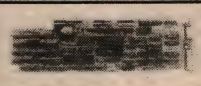
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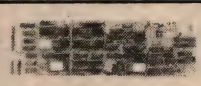
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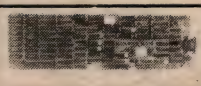
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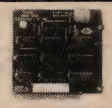
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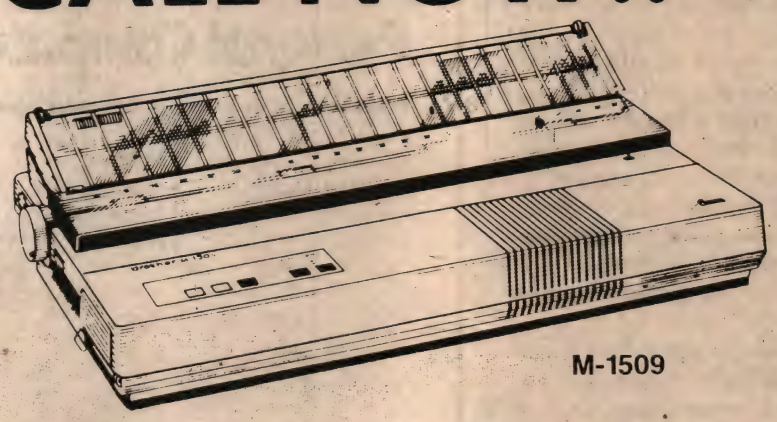
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Randy's Atari ST continued from page 74

```
File: A:\DEMOS\DCOS.PAS                    free : 608K Line:   91 Insert
            Show_Mouse ;
          END;
        which := Get_Event( E_Message|E_Timer, 0, 0, 0, 10000,
                    false, 0, 0, 0, 0, false, 0, 0, 0, 0,
                    msg, dummy, dummy, dummy, dummy, dummy, dummy ) ;
        IF which & E_Message <> 0 THEN
          IF (msg[0] = WM_Sized) OR (msg[0] = WM_Moved) THEN
            BEGIN
              IF msg[6] < min_width THEN
                msg[6] := min_width ;
              IF msg[7] < min_height THEN
                msg[7] := min_height ;
              Set_WSize( handle, msg[4], msg[5], msg[6], msg[7] ) ;
            END
      UNTIL msg[0] = WM_Closed ;
      Close_Window( handle ) ;
      Delete_Window( handle ) ;
      Exit_Gem ;
    END
END.
```

Fig. 2 Sample code & editor screen for personal pascal

made the comment that it "sure looks a lot like Lotus." I bought Lite because it was almost $100 cheaper than the full-blown model and I heard that many bugs existed in VIP Professional. So far I have not encountered any of the bugs that were mentioned earlier on (i.e. the @DATE function suppositively always returned ERR when invoked under full VIP—it works fine under Lite.) But I did find some "annoying" things—if you have a ramdisk running sometimes the screen will come up completely black after its done booting and you can't see what you are doing; you can tell that it will happen after the VIP logo disappears: if your screen turns black, you got hit with the bug. Another item I noticed was when you try to dump the screen using ALT-Help it causes truncation of the screen to occur; it appears to make the assumption that you are using a wide-carriage printer and proceeds to dump the screen in wide-carriage format; I hope VIP fixes these annoyances on the next release. Should you even have the desire, VIP offers an upgrade path for $80 and your original Lite disk. The GEM version is supposed to be out when Atari ships ST's with TOS ROMs and you'll have to go thru the same noise in sending your original disk in to VIP.

Personally, I can't see any immediate advantage in having VIP running as a GEM application outside of being able to launch a desktop function; since its present interface is reasonably familiar to those people who presently use 1-2-3. I downloaded several templates from Delphi and they all function except for the lack of macros. Since I was used to using Multiplan and used to its constraints I found VIP Lite a relatively inexpensive way to get a Lotus work-alike at a reasonable price, even if I had

continued on page 224

Hacking Atari ST continued from page 219

```
the modem quite */msout("AT
SO = 0/r");
/* wait for everything to be sent
*/ delay (250);
}
VOID msout (p)
char *p;
/* send a string to the modem*/
{
while (*p ! = '/0')
    {
    Bconout(1,*p);
    p+ +;
    }
}
```

Listing 1.
Short program to silence a smart modem.

The second short program for the AUTO folder is named Epson. I have an old Epson printer I use with the ST. If you have played around with the Install printer routine, you know that the ST can work with the Atari printer or the Epson printer. The ST defaults to the ATARI printer, so I have a short program to change it to the Epson setting.

This program uses the Setprt () extended bios call. If you call Setprt with an argument of −1, it will return the current configuration of the printer support. You can also set the printer configuration by using a different value for the Setprt call. The bit settings of the Setprt call is shown in Table IV.

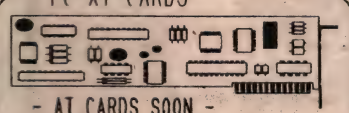
Bit	if 0	If 1
1	Dot matrix	Daisy wheel
2	Color	Monochrome
3	Draft mode	Final mode (NLQ)
4	Parallel	Serial
5	Pin feed	Single sheet

Table IV.
Bit values for Setprt call

continued on page 222

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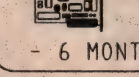
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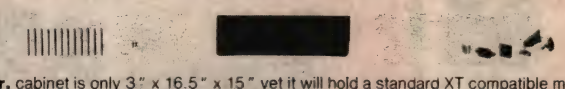
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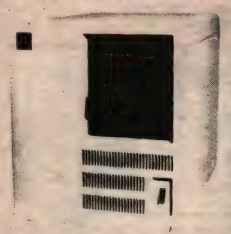
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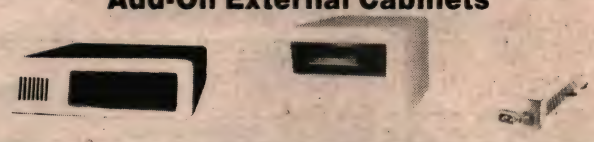
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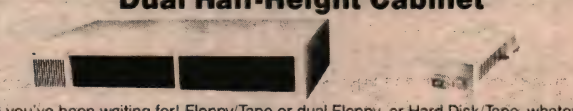
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Hacking Atari ST continued from page 221

The balance of the bits in the word are reserved. The program will get the current value of the printer configuration, and then set the bit for Epson printers. The program is given in listing 2.

```
#include <stdio.h>
#include <osbind.h>

main()
{
int current;

current = Setprt(-1);
current I = 0x0004;
Setprt(current);
}
```

Listing 2.
Program to configure for Epson support

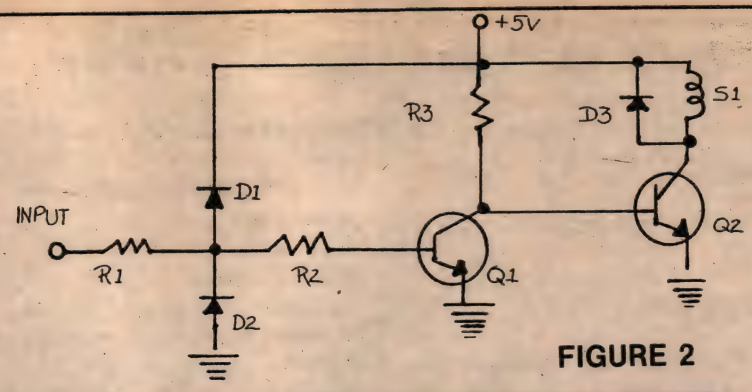


FIGURE 2

S1 .5v Dip Relay (Radio Shack 274-244)
D1, D2, D3 . . . . . IN914
Q1, Q2 . . . . . 2N2222
R1, R2 . . 3.9K ¼ watt
3 . . . . . 390 ¼ watt

Circuit to control a relay using the DTR line.

Now for the small hardware project. There are 2 lines on the ST serial port that are used for handshaking that are outputs. The DTR line can be connected to drive a small relay with a few components and an hours worth of time.

The circuit I used is shown in Figure 2. The values are not critical, this is a junk box project. Be sure the transistor used for Q2 can handle the current needed to drive the relay. The Radio Shack relay I used needed just over 100 milliamps drive, so the 2N2222 is fine. With the input connected to the DTR line, you can use the Ongibit and Offgibit extended bios calls to switch the relay.

The Ongibit and Offgibit calls use mask values, not bit numbers. The Atari documentation is a little misleading on these calls. You may notice that the serial port hand shaking line come from the sound chip not the MFP 68901. (Oh well, everything still seems to work.) A couple of one-liners is all it takes to switch the relay. The programs appear in Listing 3.

```
#include <stdio.h>
#include <osbind.h>

main()
{
Ongibit(0x10);
}

#include <stdio.h>
#include <osbind.h>

main()
{
Offgibit (0xef);
}
```

Listing 3.
Programs to control a relay with the ST.

Diodes D1 and D2 work in conjunction with R1 to limit the voltage seen by the base of Q1. The DTR line uses RS-232 voltage levels of + and − 10 volts. To ensure that Q1 is not damaged, D1 and D2 clip the input signal at approximately 0 and +5 volts. R3 supplies the base drive needed by Q2 to engage the relay. D3 is used to protect Q2 from the reverse EMF generated by the relay coil when Q2 switches off.

I built the circuit on a small perf board and used molex connectors to bring the signals

continued on page 223

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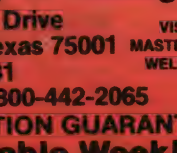
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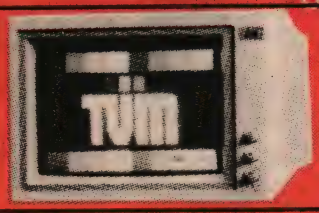


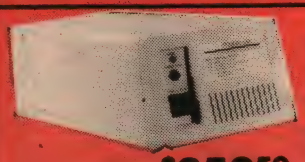
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Hacking Atari ST continued from page 222

in and out. The relay can be driven by the DTR line under program control by using Ongibit (0x10) and Offgibit (Oxef).

One I/O line doesn't seem like much, but that is all you need to switch between two different printers. You can also use the RTS line of the ST with a second circuit to control another relay. The DTR line is pin 20 and the RTS line is pin 4 of the serial connector.

If you dig around in your junk box, you should be able to come up with a relay or relays to use for printer switching. There are 10 active lines on the printer port so you will need 10 sets of contacts. Just use the relay wired to the DTR line to switch the relays that handle the printer port.

The active lines on the printer port are pins 1 through 9 and pin 11. The other pins are all grounds or no connections so they can be common to both printers, the only lines that need to be switched are the 10 active lines.

I have some relays I picked up at a surplus store that have 6 sets of contacts. Two of these have all the contacts needed for switching between the printer and a plotter I have attached to the ST. If you use the programs supplied to switch the printers, everything will be fine. If you write your own program to control the relays, be sure and allow time for the relays to switch, it is a good idea to use a delay (100) after switching the relay before trying to send data to the printer so that the relays have finished switching before you start.

Also, remember that the ST uses stream I/O, you may think you have finsihed printing, but there could still be up to 80 characters left in the printer buffer. You can delay a long time or you can check the buffer before switching.

This column is written for your benefit so let me hear what you want. Has this article had too much technical information in it, or not enough? What kind of projects would you like to see for the ST? ANTIC and ANALOG are Atari magazines and I have a good idea of the level of technical expertise of their readers, but the Shopper audience for the ST is still largely unknown, we know that you are out there, but we have no idea if you are a computer architecture expert or a beginning BASIC programmer. If you tell us what you need in the way of information on the ST, we'll be glad to provide it.

I will supply a disk with the demo programs on it in source and executable form. Instead of having an almost empty disk every time, we will try to group 2 or 3 articles worth of programs on every disk. If you want the disk containing the programs for this article, send $6 to:

Shopper ST Disk
3456 Willis Drive
Titusville, FL 32796.

Be sure and mention you want disk 1 of the Shopper ST series.

The complete pin-outs for the Serial and Parallel ports for the ST can be found in Appendix D of your Atari 520 owner's manual.

If you need the *MFP 68901 Multi-Function Peripheral Manual* try contacting Motorola at:
Motorola Semiconductors
3501 Ed Bluestein Blvd.,
Austin, Texas 78721.

Please note that they are not available to the general public, so use your business letterhead when writing.

A special folder "AUTO" can be used to hold programs that you want to execute as part of the boot up routine on your ST. We covered the Rsconf() call that allows you to configure the serial port. Also covered was the Setprt() call used to configure the printer driver used by the ST.

There are three extents for executable files recognized by the ST, .PRG, .TOS and .TTP. These extents tell the ST what kind of environment to prepare for the application. You can obtain the same effect by installing the application. ●



US Air Force continued from page 30

adapted to guide a ship.

"But Ada is not an easy language to master, and there is currently a nationwide shortage of software specialists with 'Ada fluency'," said J. David McGonagle of the GE Research and Development Center, who is managing the GE/Air Force program.

The overall goal of the GE team involved in the development contract, he indicated, is to devise software tools that help "coach" users through the demanding process of programming in Ada. For example, the software will have built-in expert system "advisors" that "ask" the user questions about the program he or she wants to write and, based on the answers, suggest ways to go about it.

To simplify the actual writing task, the GE software will incorporate special "editors" software routines that present a "fill-in-the-blanks" format for composing particular instructions in Ada.

In addition, GE is developing advanced software routines that will enable Ada authors to "program with pictures"-i.e., generate Ada code simply by drawing diagrams, charts, or other types of graphics on the computer screen. While the graphics are being drawn, hundreds of lines of Ada code will be automatically generated, increasing programming productivity substantially.

The software development contract calls for the delivery of six prototype software packages, each of which builds on-and is more powerful than-the one that preceded it. The final package is set for delivery at the completion of the contract, in August 1988.

The software is being developed on a LISP machine, but will be amenable to implementation on various other systems in its final form.

For further information contact General Electric Company Corporate Research And Development, P.O. Box 8, Schenectady, NY, 12301.

Mention that you read about it in *Computer Shopper.* ●

Randy's Atari ST continued from page 221

to sacrific some features in the short term. The documentation leaves a lot to be desired in terms of completeness and clarity: in fact they list a whole bunch of other reference sources for the user to chase after, if VIP's docs didn't answer their question. As soon as I get the TOS ROMs (more like if I ever get the TOS ROMs) and the GEM version of VIP I'll report back with an update. For now, if you *need* a spreadsheet and can live without macros or the database features, VIP Professional Lite *does* work and should be up to whatever task you have at hand.

I picked up MichTron BBS on a whim just to see what the first commercial BBS for the ST operates and it's not bad at all. (MichTron, 576 S. Telegraph, Pontiac, MI 48053; (313) 334-5700, suggested retail $49.95, no copy protection.) Although the documentation was a bit confusing I was able to bring the system up in an evening's worth of time. The BBS provides for up to 16 areas, each with their own upload/download space, and supports XMODEM, DFT and ASCII transfers, and also has a "screening" feature which allows you to inspect messages before you let them loose on the public. A nice feature is being able to emulate a user from the keyboard while no one else is on the system for checkout purposes; and if you have your printer on-line it will generate a nifty audit trail of who has called and what they did; during a live session you can see exactly what commands and functions they are performing on your ST monitor. MichTron's BBS supports intelligent modems and supports automatic 300/1200 bps switching (you'll have to do some cable re-wiring, however, but that's relatively easy to do). Now that I have my Lotus clone all that I need to do when I want to work on a spreadsheet at home is to boot up the BBS before I leave for work, call it up and upload the sheet from the IBM PC at work to my ST. Then when I arrive home it's there for me to manipulate; when I'm through with it I put the file back out on the BBS and then download it from work the following day. (The BBS looks pretty tight and would probably withstand a good attack.) If you want to see what the BBS looks like from a user's viewpoint call up MicTron's BBS (running on a Sanyo) at (313) 332-5452 and give it a spin. For under $50, it's a solid performer. ●

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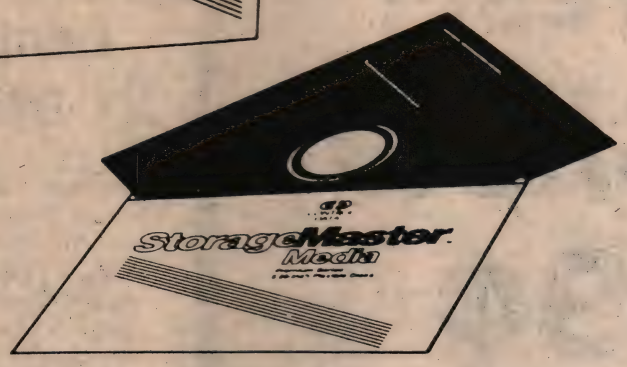
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CoCo Column continued from page 78

32 on U7 out just enough so that it won't go back into the socket.

3) Solder a 4" piece of wire (#30 wire wrap) to pin 1 of U29. Solder the other end to pin 32 of U7.

4) With one end of a 6" piece of wire bridge pins 2 and 3 of U29 together.

5) Replace the two chips being careful to seat all pins (CoCo II—install the two sockets where the chips were), then tack solder the loose end of the wire from pins 2 and 3 of U29 to pin 2 of U7.

You're finished!!

To install a switch so you can choose your mode use a subminiature spot toggle switch. Connect the wire from pin 1 of U29 to the bottom pole, the wire from pin 32 of U7 to the center pole, and the wires from pins 2 and 3 of U29 and pin 2 of U7 to the upper pole. Drill the appropriate size hole in the front or back of the CoCo case and mount the switch.

OS-9 Conquers The World?

For all of us OS-9 users feeling neglected and misunderstood by the computer world, our fortunes are about to change. N.V. Philips, the huge international electronics firm, has just introduced at a recent industry wide CD-ROM conference a standard Compact Disk player interface called CD-I (Compact Disk Interactive). This standard will be accepted worldwide as the norm for the production of CD units for both music and data storage. The standard will make future CD units into complete home entertainment centers as well as data storage devices and will have a 68000 microprocessor built in. They will be, in effect, home computers.

The big announcement for

continued on page 227

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IBM Sells Product Centers To Nynex Corp.

Nynex Corporation, the former New York Telephone Co. agreed to buy IBM's retail product centers in the United States. When the sale is completed on June 30, IBM will be out of the retail computer store business and will return to their traditional methods of selling through direct sales, dealers, and value added resellers. While IBM Product Centers have provided a standard for PC sales and an easy method of access to IBM software for users, they have not proved profitable for the company. The restriction of selling one brand and being tied to fixed prices was too much for even the computer giant. In addition to selling their stores, IBM previously froze their retail dealerships at 2,500 restricting the number of stores that were authorized dealers. They have also been trying to stop, or reduce the flow of IBM computers into the "grey market" channels.

Nynex now operates 21 outlets in its Datago chain and they will add 81 IBM Product Centers changing the name of the combined business to Nynex Business Centers making this chain the third largest non-franchised chain in the United States behind Sears and Businessland chains. This also continues the shrinking of the computer store business where independent retailers have been disappearing or merging into larger groups.

The Nynex Centers will sell IBM, Compaq, AT&T, and Apple computer lines plus a wide range of software. In addition, they will sell telecommunications products, such as telephone systems and modems. IBM personnel now working in the Product Centers will be given the choice of transferring within IBM, or working for Nynex when they take over the stores. In areas where IBM Product Centers compete with Nynex Datago Centers, the stores will be consolidated. ●

CoCo Column continued from page 226

CoCo and OS-9 users is that the operating system for the CD-I standard will be OS-9!! This means that our beloved, if somewhat difficult Unix like operating system will be installed on millions of CD devices worldwide! The fortunes of Microware and OS-9 users will change dramatically. Depending on the success of CD-ROM technology in the marketplace, (which most prognosticators say will explode in the next two years) OS-9 will be installed on as many devices as MS-DOS! To date part of the reason the technology hasn't taken off was the lack of any clear standard. With a standard in place and given the large numbers of applications for which the CD-ROM can be used it is logical that OS-9 will then be carried over to other hardware devices.

The conference, sponsored by Microsoft during March 4-7, was attended by more than 1000 industry bigwigs. It was a computer industry first in trying to address the route of manufacturers as they tie into the amazing CD-ROM technology.

Could OS-9 become a world standard? The hardware marketplace is hardly a stable place, but given the projected success of CD-ROM technology, with it's ability to store 500 + megabytes of data (music, pictures, text, anything) on a regular size CD platter, the emergence of OS-9 as a direct competitor to MS-DOS is now a real possibility!

For all of those who have avoided OS-9, and those like myself who have gotten frustrated with the difficulty of its syntax and put it aside, now is the time to go to Radio Shack and get the latest version (Version 2.0) or dust off those OS-9 disks and start working again. We're about to go from being a select minority to part of a large mainstream group of OS-9 users.

I'll keep you posted on all further developments in the CD-ROM arena. Our future as OS-9 users keeps looking brighter and brighter!

Next Month

We'll be looking at the two most popular 256K memory upgrades for the CoCo, and the software that makes use of the increased RAM. A couple of 512K boards for the CoCo have hit the market and we will be examining them in the future.

To leave me a message or give feedback on the column I can be contacted on the CoCo SIG on Compuserve (ID# 72245,126) or on the Turtil's Pond BBS at (201) 340-9094. ●

Disk Operating System For Tandy Laptop Computers

A program that allows 3 1/2 inch portable disk drives to operate with the popular Tandy and NEC laptop computers has been released by Traveling Software Inc. TS-DOS, developed by the Seattle-based company specializing in software for laptop computers, is an operating system designed to work with the Tandy and the Brother FB100 portable disk drives.

TS-DOS allows the Tandy Model 100 and 200 and NEC PC-8201 laptop computers to be used as portable disk-based systems. Integrated with the operating systems of these computers, TS-DOS becomes an extension of the built-in BASIC language as well as the file menu. TS-DOS is also integrated with the Ultimate ROM II, a multi-application ROM chip from Traveling Software.

The Tandy and the Brother FB100 portable 3 1/2 inch disk drives weigh just 1 3/4 pounds and operate on four AA batteries for up to eight hours of typical use. The drive measures a mere 6 by 5 by 2 inches and operates at 19,200 baud via a serial RS-232 cable.

TS-DOS is available on 3 1/2 inch diskette for $69.95 from independent computer dealers or direct from Traveling Software. Traveling Software also offers a Brother FB100 3 1/2 inch portable disk drive bundled with TS-DOS for $249.95.

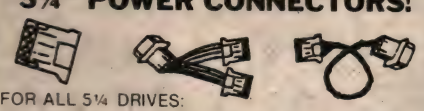
For additional information contact Traveling Software, Inc., 11050 Fifth Avenue N.E., Seattle, WA 98125; (206) 367-8090.

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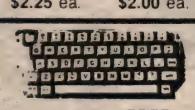
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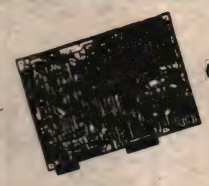
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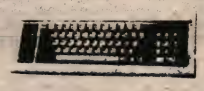
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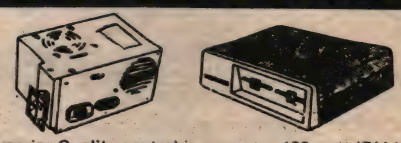
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Tandy Model 600 continued from page 77

I had no trouble transferring files from the Model 600 to an Osborne One and back via a hardwired cable and my tests on CompuServe and other networks were successful.

The RS232 port uses a female DB25 connector. The printer (Centronics) port uses a male ribbon connector. A Tandy-provided cable used with a parallel printer gave me no problems. However, attempts to address a serial printer on the serial port (via a self-made cable) were unsuccessful. If you have a particular printer in mind, it'd be wise to confirm that the two will commmunicate.

Conclusion

As a machine for a "techie" the Model 600 is a total washout. The Model 600 is without a doubt a "niche" computer and for those who need its features, it's a perfect choice. For business people with a need for a portable data terminal, it is an excellent choice. This is an great second computer to use with a desktop. The Telcom package makes it easy to transfer your data file to your primary computer. As a stand alone unit, I couldn't recommend it.

TANDY 600

by Stan Veit

I have been a Tandy portable fan ever since I first reviewed the Model 100 for *Computers & Electronics Magazine*. I bought one of the first one I could get, expanded it and used it with Traveling Software's great programs. I even bought the Video/Disk Interface before I could borrow a test unit from Tandy to try out (a fact that I was sorry about). I have a wish list for a lap top portable and I hoped that the Model 600 would answer all of my wishes. It almost did, but not quite.

Cheryl Peterson has covered the unit very completely but I want to add my reactions to the machine I was lent as a review unit. I loved the word processing improvements over the Model 100, and the File program. I am not a person who has call to use a spreadsheet outside of my office, so after making sure it worked and was easy to use, I changed the Plan ROM for the Microsoft BASIC ROM and found that to be very useful. Every year we have The Great Indian River Festival here in Titusville and the big event is the Indian River Raft Race. We enter a raft and usually win something. This year Glenn Patch has $500 riding on our raft and the Boss wants to win. (The prize money is donated to the playhouse in town, no matter who wins.) I wrote a program to calculate the bouyancy of our raft and determined at what point it becomes a submarine. This program runs on the Model 600 and is a good application for a portable.

There are so many portables out now that I have lost some of my enthusiasm, but I do like the Model 600 a lot. I would buy it in a second except for two things. First, it does not run MSDOS, (I would live without this because I can transfer files to my PC.) Second, you can not save directly to the disk. You must save to to RAMdisk and then transfer to disk. Why should this upset me? I suppose I am a creature of habit, but why go through two steps to save a file or program on a floppy? Tandy and I just look at things differently, but I am the customer and I made my decision on that basis. One more thing that bothers me is the handle. It isn't there. Now if *I* was designing a portable I would *start with the handle*. Still and all, I told Tandy that I would not return the Model 600 until after the Raft Race. We better win! ●

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New Tandy 3000 Has 35MB Hard Disk

Tandy Corporation recently announced a new version of the Tandy 3000 computer featuring a 35 megabyte high performance hard disk drive. The system is priced at $4499.

"The Tandy 3000 35MB HD computer offers a full five megabytes more storage, greater memory expansion capabiity and a standard 640K RAM — 128 more RAM — than the newest IBM PC/AT with which it is fully compatible," said Tandy's chairman, CEO and president John V. Roach. "This system leads the industry trend towards greater disk storage capacity and greater memory at the excellent price consumers have come to expect from Tandy. It's available now through Radio Shack Computer Centers nationwide."

"The Tandy-designed and built Tandy 3000 20 MB HD computer, priced at 26 percent less than the IBM PC/AT 239, has been extremely popular with our major corporate customers since its introduction last November. The new version continues Tandy's leadership in bringing business customers the highest quality, Price/performance and capability," said Ron G. Stegall, senior vice president of the company's Business Products Division.

The Tandy 3000 35MB HD will be sold with one 1.2 MB floppy disk drive and a standard 640K memory. Memory in the Tandy 3000 computer can be expanded to 12 MB under the soon-to-be available Xenix operating system, a full two megabytes more than possible with the IBM PC/AT.

The Tandy 3000 computer uses the Intel 80286 microprocessor and operates at 8 megahertz. The Tandy 3000 Deluxe Graphics Adapter displays the standard IBM CGA modes as well as additional modes, including 640 x 400 two-color and 640 x 200 16-color, using Tandy's outstanding non-interlaced, flicker-free monitors.

Standard features include a real time clock with battery backup, a serial/parallel adapter, industry-standard keyboard, and a provision for an optional plug-in math co-processor.

A full range of options are supported through ten expansion card slots, 7 of which are open in the standard hard drive computer.

For further information contact Tandy Corporation/Radio Shack, 1800 One Tandy Center, Fort Worth, Texas 76102.

Mention that you read about it in *Computer Shopper*. ●

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DIABLO HYTYPE II Fabric Black	NOT EZ LOAD 5/16 x 17	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH	1/2 x 52	RS DMP-2200			$18/1	$16 ea	2 or more	$30/3	$57/6	$108/12
Carbon Film - DWP 210 (Hytype II) Black (1445)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1419)	1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
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NEC Spinwriter-Carbon Film - 2000-3500 (Reloads BCCOMPCO Only)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
- 5500-7700 (Can Reload Most Types)	NOT EZ LOAD 1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
-Fabric - 2000-3500 (Can Reload All)	1/2 x 14	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
- 5500-7700 (Can Reload All)	1/2 x 13	$15/2	$42/6	$ 78/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
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PANASONIC KXP-1090-1091-1092	Inker Loop	$20/2	$57/6	$108/12						
BROTHER HR-15-25-35 Carbon Film (Multistrike)	5/16 x 82	$18/3	$60/12	$342/72						
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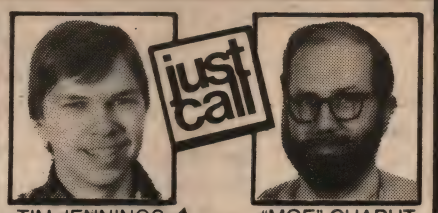
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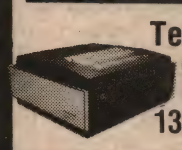
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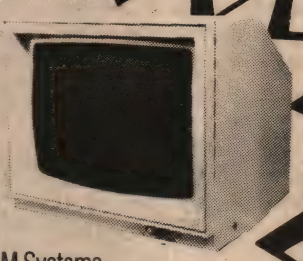
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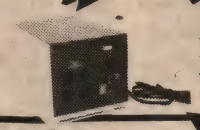
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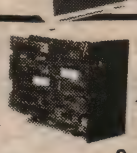
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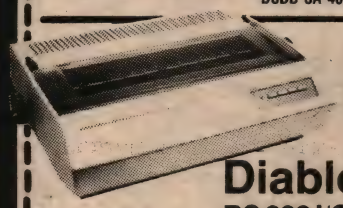
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TI Forum
continued from page 212

Cherimoya Court, Fontana, CA 92335) and in Canada by Ryte Data (210 Mountain Street, Haliburton, Ontario, Canada K0M 1S0). The products included an expanded version of Extended Basic with 20 new commands and 40 new graphics routines, a mouse with an icon-driven disk manager software, and a 128K Gram Karte, which will allow the saving and using of modules on disk. All were up and running in LA. Also announced for the future were an 80 column upgrade device and an Eprommer, to allow user to make their own cartridge software. Write for details and availability of these new products.

At T.I.C.O.F.F., Ryte Data showed the new Mechatronic's product line, and Asgard (POB 10306, Rockville, MD 20850) showed three new software products: Artist Companion clip art to go with TI Artist, Recipe Writer (by Warren Agee; a very nice recipe database, superfast), and Quick Dialer (by Mark Larry; a dialer for smart modems and virtually any emulator program). As an aside, rumor has it that Asgard will be moving into the hardware fray by the time you read this with a major hardware upgrade for the TI. As soon as we hear something definite, we'll post the details.

Myarc (241 Madisonville Rd., Basking Ridge, NJ) announced a change in their original plan to market a full-blown computer upgrade for owners of the 99/4A. They said the full computer would be replaced, effective immediately, by a project to produce a card for the peripheral expansion box to allow the attachment of a PC-type keyboard. A GROM port for plugging in modules was not to be included with the keyboard/card, but software was promised to allow you to save cartridges to disk and then load them with the new system. Price or availability was not announced.

Hardware Galore!

So there you have it. Exciting new hardware just on the horizon. By our count, there are at least six 128K or greater memory expansion cards, three GROM emulator cards, and three new keyboard upgrades/interfaces. Throw in a mouse, an 80 column device, an Eprom burner, and two new expanded Extended Basics and ask yourself "Upgrade to what?" The Fairs of late (there are several more planned), have served to reaffirm the product support and the consumer's eager to buy new products. Now, whose an orphan?

Fairware

John Taylor (2170 Estaline Drive, Florence, AL 35630) has done as much for the rise of Fairware as anyone. With his terrific Sprite Builder and, now, with two new releases. "Checkbook and Budget Manager" is an XB program that comes as close as you can get to a full home financial manager (like "Dollars and Sense" for other machines) as you can find for the 99/4A. It allows between 100 and 400 checkbook records per month (limited only by disk space) and up to 99 user-definable budget categories. Printouts and summaries are easy to do. It is one truly great piece of programming. It requires XB, 32K and disk drive. Also, John has "resurrected" some adventure games, once sold commercially, for Fairware distribution. They are the "MS-Adventure Series," all in assembly and lightening-fast. A trilogy of adventures exist (Search for Murgen's Keep, the Enchanted Keep, and the New King) and are available from John as a package. There are two ways to get the programs: either send an initialized disk, self-addressed mailer, and return postage (one each for CB/BM and/or the Adventure Trilogy) OR send $5 for EACH program and John will provide the disk and mailer. Just as in any Fairware, payment is expected if you use the programs. William Harms (6527 Hayes Ct., Chino CA 91719) is making available a beauty of a software program. It is called "FAS-Tran" and it's a checkbook program with a major twist: it allows for saving category totals in SYLK format to be loaded into Multiplan (tm). Also has a very nice spreadsheet program of its own in the massive program (it takes up 2 SSSD disks or 1 DSSD). Documentation is on the disk also and it is extensive. Send two disks, return mailer and postage to Harms and pay for it later if you use it. If you have Fairware to offer, let us know at *Computer Shopper* and we will publish details.

Smart Programmer Revived

It was announced recently that two of our finest publications, *Smart Programmer* (Millers Graphics) and *Super 99 Monthly* (Bytemaster Computer Services, 171 Mustang Street, Sulphur, Louisiana 70663) would merge into a single publication. Those having unfulfilled subscriptions to either publication would begin receiving the new publication as of the April issue. The subscriptions to either or both would be prorated so as to provide a full compliment of issues paid for. The combined publication would be a monthly 16 page, technically-oriented publication in the tradition of the renowned Smart Programmer which had been hindered by publication delays. The new editor, Richard Mitchell, promises timely delivery and a continuation of the quality found in both. Subscriptions can be had for $15 by writing to Bytemaster.

C For The 99/4A

I (RA) have been exploring C99 for the TI of late. Written by Clint Pulley (38 Townsend Avenue, Burlington, Ontario, Canada L7T 1Y6) and available as Fairware, the language is a full-featured version of "small c." I have found few limitations with the language (lack of floating-point and math routines are the major ones), and have been able to do some nice routines with the language. Briefly, C is a very popular programming language through which, it has been estimated, 70% of commercial software for other machines is written. So what makes it different? It is a "compiled" language. That means, once you have written your program in c99, you run a companion program called a compiler. The compiler takes your C source code and generates assembly source code. The resultant code can then be run through the TI Assembler to generate object code, which executes just as fast as if you went through the strenuous (to me, anyway) task of writing assembly source code to start with. C is much easier to learn than Assembly language and is efficiently compiled with the c99 compiler. I have seen some programs written with c99 alone (by Clint Pulley and Warren Agee) and they are indistinguishable from pure assembly language, because the end-product is just that. If there is any interest, I will address the language more in depth in future *Computer Shopper* columns. Write and let us know. It is a marvelous programming tool. ●

Suggested Readings
continued from page 86

Forth. Even the Floating Point operators (F+, F*, etc.) are the same as TI Forth. Using this book requires almost no changes to the examples. This book was written for the individual who is interested in process control or data acquisition, and presumes interest in process control. The text presumes knowledge of mathematical terms and data formats (arrays, strings, fixed-point, etc.). The final third of the book shows process control and data acquisition applications on a PDP-11/23. These are very sophisticated subjects including analog to digital conversion and advanced signal processing. For a "hacker" TI'er, this could be just the ticket. It may be over the heads of many novices, however.

The final new entry is simply *Forth* by W.P. Salman, O. Tisserand, and B. Toulout (Springer-Verlag, 1983, 130 pages). Originally written in French, this translation suffers technically in several places. Typographical errors in the Forth code occur frequently, and are not always easy to find. This book also is FIG-Forth oriented, but covers topics very quickly. By page 22, the mixed-length operators are introduced, and by page 58 the memory map for a typical system is covered. The final section of the book gives PLENTY of examples on how to code things, and the code is decent. The final chapter ("Problems") covers very advanced topics: complex numbers, recursion, trigonometry, and file-management. I mildly recommend this book, but you have to know what you are doing when you work the examples.

Books are not the only materials that cover Forth. Magazines do too. The major magazine that covers Forth is called *Forth Dimensions* and is published bi-monthly by the Forth Interest Group (FIG, P.O. Box 8231, San Jose CA 95155, $20/yr). This periodical is for those who have progressed beyond the materials presented in books such as those listed above. Many times this magazine goes off into "theoryland" and loses beginning programmers. Once you are past that stage, however, *Forth Dimensions* quickly becomes a valuable resource. Articles cover topics that range from TI 99/4A screen dumps to complete spreadsheets for Forth-83. There is a Q-and-A column, letters to the Editor and other normal things too. See your local FIG chapter or find someone who will loan you some issues before you decide to subscribe. *Forth Dimensions* is not for everybody, but it can be an invaluable resource.

Another magazine that covers the Forth arena is a relatively recent starter (it began in late 1984) called *Computer Language*. This is not solely dedicated to Forth, or any other language (Forth, C, and Pascal are covered about equally). The Forth topics that have been covered to date have not been heavy theoretically, so check the newsstand each month to see if the topics covered interest you. Some articles are trivial from a TI'ers point of view (one article gave code on how to add recursion to Forth, a power TI Forth already has), but others are quite good.

Still another source of Forth information is the *TI Forth Notes* from the LA-99ers (P.O. Box 3547, Gardenia, CA 90247). These are three volumes of articles collected from user groups newsletters around the country. Vol #1 is $1.75; Vol #2 is $1.75; and Vol #3 is $2.50, all post-paid. I was dismayed that so much of the information is duplicated between the volumes. Volume #1 is poor, and I don't recommend purchasing it. Volume #2 is better, and covers what Vol #1 did (by now I think everybody knows how to put Forth on a double-sided disk). Volume #3 is the best, and I do recommend it. It gives a different perspective, and contains better information. Overall, if you're going to get any, get Volume #2 and #3. Still, if you belong to a user group, some of this information may have come your way already.

I hope this helps you in your decision on reading material. There are others, of course, so don't ignore those merely because I didn't cover them. So, go Forth and read. Then you'll be ready for some advanced programs. ●

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User Group Submission Policy

All User Group entries must be submitted in writing by the first Monday of every month. **Submissions received by the first Monday of July will appear in the September issue.** The listing will be good for three issues thereafter. After this period they will be deleted unless we receive a post card or letter confirming the board is active. It is the responsibility of the person who submitted the listing to mail all corrections, updates, and deletions to *Computer Shopper*. Remember, if you do not let us know when your club is inactive, it will be listed until deleted.

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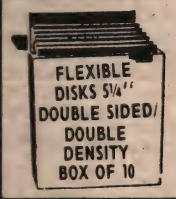
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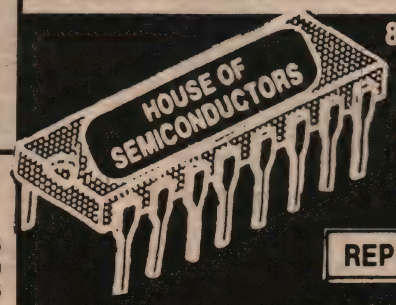
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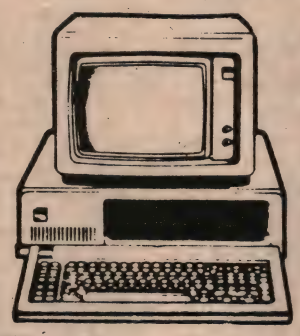
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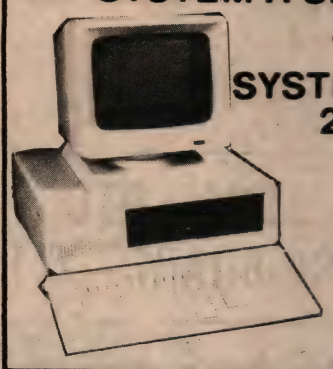
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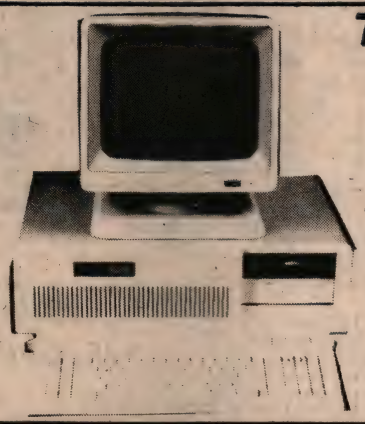
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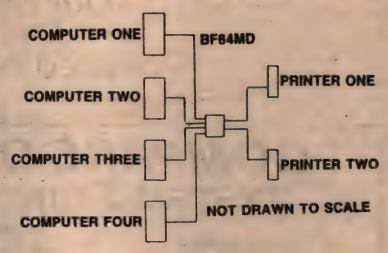
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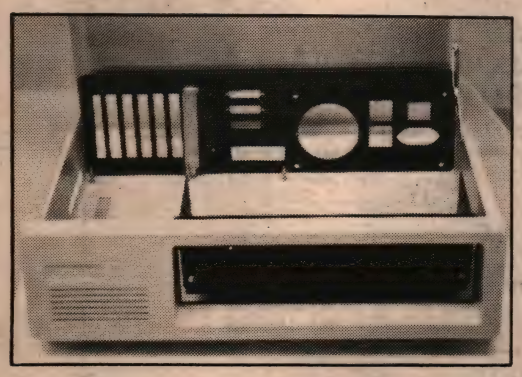


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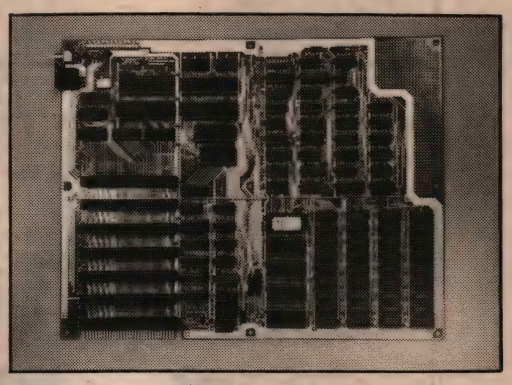


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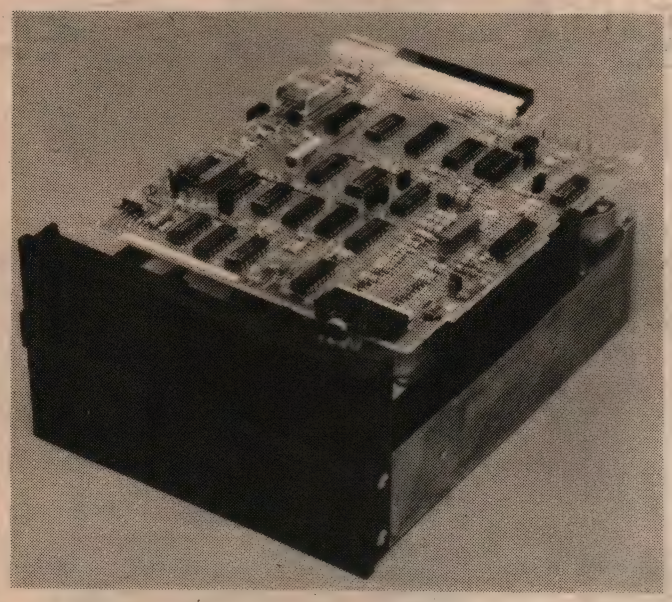
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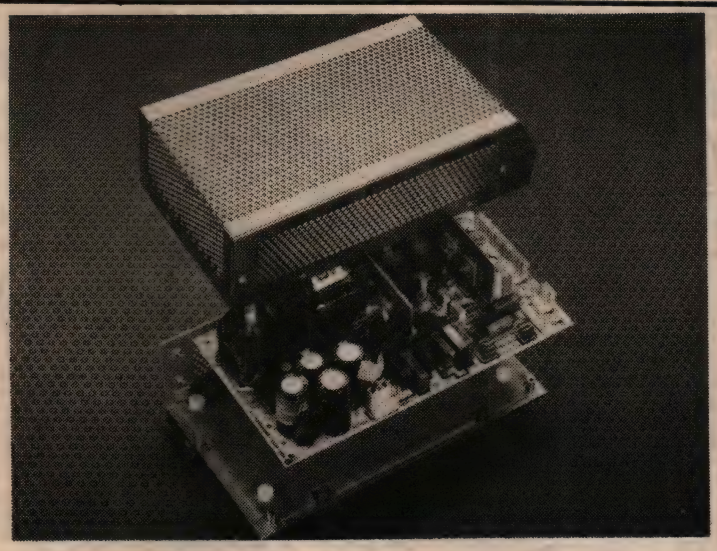


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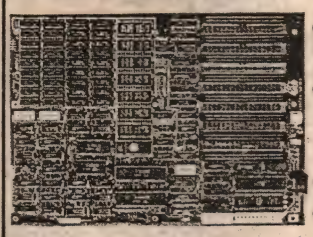
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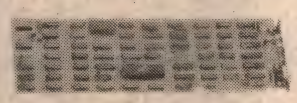
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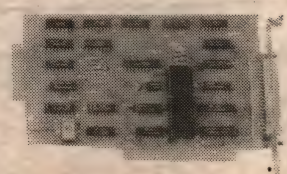
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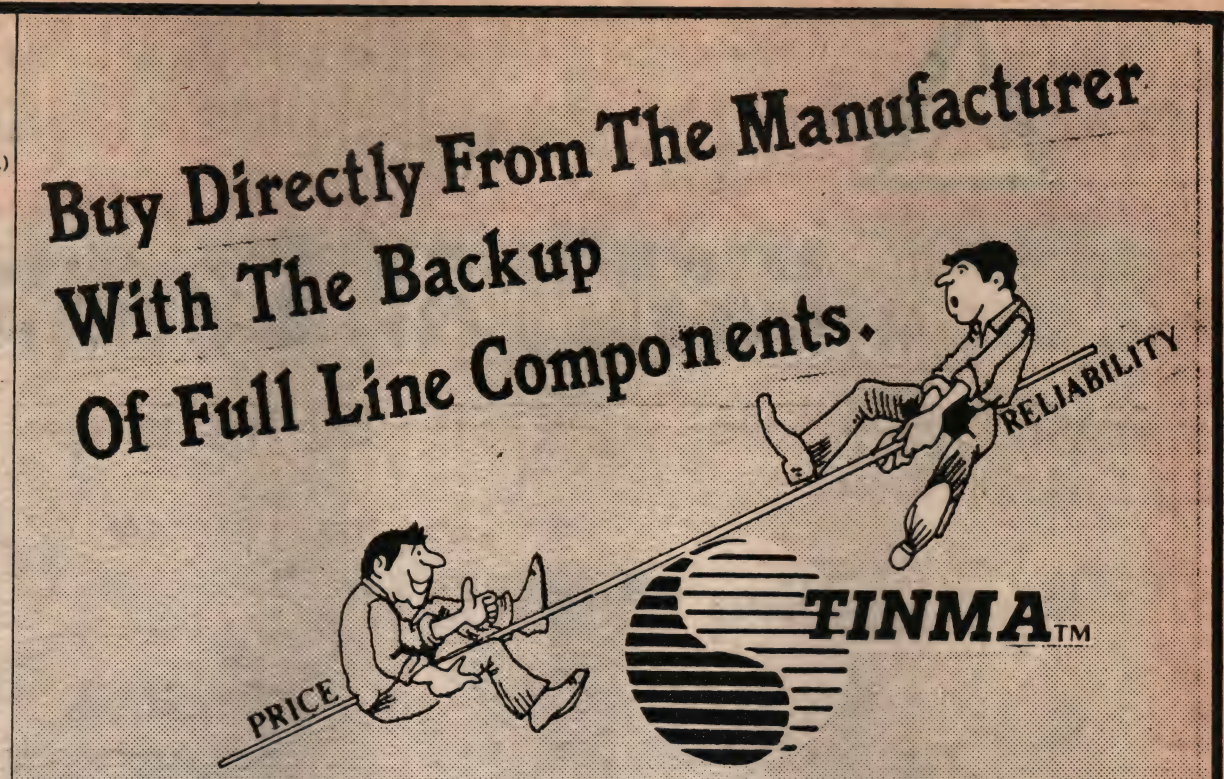
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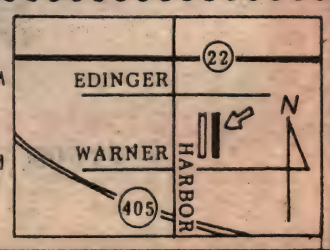
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All Bulletin Board entries must be submitted in writing by the first Monday of every month. **Submissions received by the first Monday of July will appear in the September issue.** The listing will be good for three issues thereafter. After this period they will be deleted unless we receive a post card or letter confirming the board is active. It is the responsibility of the person who submitted the listing to mail all corrections, updates, and deletions to *Computer Shopper*. Remember, if you do not let us know when your board is down, it will be listed until deleted.

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THE REALM OF EVIL, Apple II. 201-694-1547 *24
SILVER SURFER'S BEACH, 201-398-8761
SKULL ISLAND BBS, Millburn. NJ 201-379-1459; Atari: 300 baud *24
SKYLANDS BBS Ringwood. NJ 201-962-4956 *24
SMERSH AE NJ 201-793-3274 *24
THE STADIUM, Waldwick. NJ 201-445-8055
STAR FLEET COMMAND, Atari. 201-839-3062 *24
STUDIO 64, C-64. 201-696-0639 *24
SYNDICATE BBS, Middlesex. NJ 201-968-8148 300 BAUD *24
TIBBS Brick. NJ 201-477-7263
TIBBS Tom's River. NJ 201-929-8161
THE TRON BOARD, North Bergen. NJ 201-869-5460
THE WAR ROOM, Bloomfield. NJ 201-743-8653: 300/1200 BAUD *24
THE WHITE HOUSE BBS Clark. NJ 201-388-1676 *24
XEVIDUS ISLAND, Atari. 201-835-8340 *24

ARMU Washington. 202-276-8342
DYNABOARD-64, Washington. D.C. 202-686-5230 *24
PCP/M RBBS Cranford. NJ 202-272-1874
PSBBS Washington. D.C. 202-337-4694 *24

F.S.L.-COMMODORE Washington. D.C. 202-745-2973 *24

64 NEWSROOM BBS, Northfield. CT 203-484-0178 6pm-8am weekdays. *24 on weekends
BULLET-80 Danbury. CT 203-744-4644
BULLET-80 Seymour. CT 203-888-7952
COLORAMA OF WESTBROOK, Westbrook. CT 203-669-1165 *24
COMPUTER TOOLBOX, Waterbury. CT 203-271-1579: 300/1200 BAUD *24
GATEWAY FIDO, CT 203-669-8896
THE HORNETS NEST HBBS/AE. CT 203-453-1235 *24
INADEX, Cheshire. CT 203-271-1203 7am-10pm (eastern time)
MET-CHEM-BBS Hamden. CT 203-281-7287 business hours
THE PHANTOM ZONE Stamford. CT 203-356-9679 *24
SKYLINE SUPER SYSTEM Ellington. CT 203-875-7852 4pm to mid. 300 BAUD
STAR TREK BBS, Baltic. CT 203-822-8176: 300 baud: XMODEM *24
THE SWITCHBOARD NETWORKS Clinton. CT 203-669-3456 *24
TELECOM 7 New Fairfield. CT 203-746-5763 *24
TOTAL BOARD Meriden. CT 203-634-0052 *24

(T)HE (A)PPLE (G)ROUP Auburn. AL 205-826-6053
The BULLETIN BOARD Tuscaloosa. AL 205-758-5017 Monday. Wednesday. Friday. Saturday. Sunday 8pm-7am
FORUM-80 Montgomery. AL 205-272-5069
MONTG. PCUG RBBS, Montgomery. AL 205-264-2278: 2400 baud: 5pm-8am; *24 weekends
RCP/M RBBS Huntsville. AL 205-895-6749
TRANS WORLD ATARI, Ozark. AL 205-774-8464: 1200/300 baud *24

ABYSS, Kirkland. WA 206-827-9063: Apple: 300 BAUD
ACCESS NORTHWEST, Vancouver. WA 206-573-7006: IBM: 300/1200/2400 BAUD
ACTION ANNEX, WA 206-892-8969: Atari: 300/1200 BAUD
ALKI EXPRESS, Seattle. WA 206-937-5800: C64: 300 BAUD
ANNEXIAN, Seattle. WA 206-282-9694: C128: 300 BAUD
A.P.P.L.E. CRATE I, Kent. WA 206-872-6789: Apple: 300/1200 BAUD
A.P.P.L.E. CRATE I, (Alternate #) Renton. WA 206-251-0543: Apple: 300/1200 BAUD
A.P.P.L.E. CRATE II, Seattle. WA 206-525-5410: Apple: 300 BAUD: 8pm-8am. *24 on weekends
ARCADIA, Seattle. WA 206-523-6133: C64: 300 BAUD
ARRAKIS, Richmond Beach. WA 206-542-4628: C64: 300 BAUD
A.R.S. (AMATEUR RADIO SUPPLY), Seattle. WA 206-767-3223: C64: 300 BAUD: 6pm-9am
THE ATARI DOGHOUSE, Montesano. WA 206-249-3228
AUTOMAN, Kent. WA 206-854-6336: Atari: 300/1200 BAUD
BACK TO THE FUTURE, Seattle. WA 206-281-8674: 300 BAUD
BADLANDS, WA 206-486-1826: 300/1200 BAUD
BAKER STREET, Kent. WA 206-854-0193: Atari: 300 BAUD
B.A.U.D., WA 206-722-1882: Kaypro: 300/1200 BAUD
BBS AT THE END OF THE UNIVERSE, WA 206-820-1700: Atari: 300 BAUD
BELLEVUE ROS, Bellevue. WA 206-641-4521: Kaypro: 300/1200 BAUD
BLACK MARIAH, Bellevue. WA 206-641-5833: C64: 300 BAUD
BOGUS ZONE, Auburn. WA 206-939-6143: Atari: 300 BAUD: 10pm-6am
BOILER ROOM, Everett. WA 206-347-1008: Atari: 300/1200 BAUD
BONGOLAND, Kent. WA 206-852-8588: 300/1200 BAUD
BRACE BBS, WA 206-644-1144: Atari: 300 BAUD
BUDGET BOARD, Renton. WA 206-271-8613: Atari: 300 BAUD
BUFFALOE BILL'S, Seattle. WA 206-241-5672: Atari: 300/1200 BAUD
CADDY SHACK, Seattle. WA 206-932-8912: C128: 300 BAUD: Closed Sun. to 10
CAMELOT, Bothell. WA 206-487-1992: Atari: 300/1200 BAUD
CAMP CRYSTAL LAKE, Renton. WA 206-271-2211: C64: 300/1200 BAUD
CARTEL, Kent. WA 206-825-3420: LD: 300 BAUD
CBBS/BECS, Renton. WA 206-235-9496: SBC-200: 300/1200 BAUD
CBBS/PUGET SOUND, Kent. WA 206-630-5229: SOL: 300/1200 BAUD
CHALLENGER 51-L, Kirkland. WA 206-827-0346: TRS-1: 300/1200 BAUD
CHAMELEON CIRCUIT, Everson. WA 206-966-4855: Apple: 300/1200 BAUD: 10pm-7:30am
COLOSSUS: DATA DISCOUNT SERVICE, Mercerls. WA 206-236-2566: Compaq: 300/1200 BAUD
COM-SOFT, Everett. WA 206-337-2144: C64: 300 BAUD
COM-SOFT, (Alternate #) Lynnwood. WA 206-742-8422: 300 BAUD
COMMODORE USER GROUP (CUG), Lynnwood. WA 206-743-6021: C64: 300/1200 BAUD
COMMODORE USER GROUP EAST & SOUTH, Seattle. WA 206-364-6497: 300/1200 BAUD
COMPASS, Seattle. WA 206-523-2530: C64; 206-523-2530: 300 BAUD
COMPUTECH INFORMATION SERVICE, Tacoma. WA 206-759-4391: LD: 300 BAUD
COMPUTER EXCHANGE, Seattle. WA 206-431-8664: TRS-1: 300/1200 BAUD
DELTA HOUSE, WA 206-232-1155: Atari
DIAL YOUR MATCH, Fed. Way. WA 206-485-6062: Apple/C64: 300 BAUD
DIAL YOUR MATCH -47, WA 206-839-3415: 300 BAUD
DIANE'S PLACE, Bellevue. WA 206-643-9129: C64: 300 BAUD
DOCTOR'S REALM, Seattle. WA 206-364-6268: Atari: 300 BAUD: 8pm-8am
DOSFILE XL, Seattle. WA 206-367-3453: Atari: 300/1200 BAUD
DOWNSPOUT, Seattle. WA 206-325-1325: Epson: 300/1200/2400 BAUD
DRAGON'S CAVERNS, Richmond Beach. WA 206-542-2757: Atari: 300 BAUD: 10:30pm-8am
ELECTRONIC ANTIOCH, WA 206-443-0629: Apple: 300 BAUD: 8pm-8am weekdays. *24 weekend
ESKIMO NORTH/POLYNET, Seattle. WA 206-367-3837: TRS-16: 300/1200 BAUD
ESP, WA 206-885-1722: C64: 300/1200 BAUD: 10pm-6:30am
EVENT HORIZON, Issaqua. WA 206-392-5829: C64: 300 BAUD: 9:30am-5:30am
FIDO: BECS TANDY, Seattle. WA 206-527-5618: Tandy 1200: 300/1200 BAUD
FIDO: DATA JOCKEY, Bellevue. WA 206-643-0909: IBM PC: 300/1200 BAUD; 7pm-6am
FIDO: EMERALD CITY, Bothell. WA 206-481-6549: Amer XT: 300/1200 BAUD; 6pm-10am
FIDO: HEATH/ZENITH, DesMoines. WA 206-941-6943: IBM PC: 300/1200 BAUD
FIDO: PTC-NET, Burlington. WA 206-757-5233: 300/1200/2400 BAUD: 5pm-7am: *24 weekends
FIDO: TROUBLE SHOOTER, WA 206-922-0106: Sanyo: 300/1200/2400 BAUD
FIDO: UNDER THE RAINBOW, Bothell. WA 206-485-5320: DEC Rnbw: 300/1200 BAUD: 4:30pm-10pm
FIDO: WATER SHED, WA 206-878-1941: AT&T 6300: 300/1200 BAUD
FOUNDATION AND EMPIRE, Seattle. WA 206-323-1330: Atari: 300/1200 BAUD
FPS TECH-BOARD, Tacoma. WA 206-565-9465: 300/1200 BAUD
FRENCH CONNECTION, Lynnwood. WA 206-775-4447: TRS 2: 300/1200 BAUD
GALACTIC UNIVERSITY, Seattle. WA 206-431-0557: Atari: 300 BAUD
GAS-XE, Lynnwood. WA 206-745-4077: Atari: 300/1200 BAUD
GATEWAY, Silverdal. WA 206-698-1388: LD: 300/1200 BAUD
GNOMES GNOLL, Everett. WA 206-334-0223: LD
GREAT WHITE NORTH, WA 206-828-9453: Atari: 300 BAUD
HAM NET & ELECTRONICS, Seattle. WA 206-285-3040: C64: 300 BAUD
HARRY'S HIDEAWAY, Renton. WA 206-226-7506: C64: 300 BAUD: 8pm-7am
HEATH USERS' GROUP PERSONAL BBS, Seattle. WA 206-782-1302: H-101: 300 BAUD: 4pm-7pm: *24 weekends
HI-FI T-ROOM, Seattle. WA 206-723-7437: Apple: 300/1200 BAUD
HYBORIAN AE, Seattle. WA 206-522-2508
I.B.S. SYSTEMS: GIG HARBOR BBS, Gig Harbor. WA 206-858-2028: LD: 300 BAUD
I.B.S. SYSTEMS: OUTER LIMITS BBS, Seattle. WA 206-285-3210: C64: 300 BAUD
I.B.S. SYSTEMS: TECH SYSTEM BBS, Bellevue. WA 206-453-0903: C64: 300 BAUD: 10pm-7am
INFORMATION MANAGEMENT SYSTEMS, Tacoma. WA 206-535-2730: Kaypro: 300/1200 BAUD
INFORMER SYSTEMS, Everett. WA 206-337-4078: C64
INVISIBLE SEATTLE, Seattle. WA 206-784-7685: IBM PC: 300/1200 BAUD
JOB SYSTEM, Bothell. WA 206-487-3290: IBM PC: 300/1200 BAUD
J.R.-XCHANGE, Richmond Beach. WA 206-542-8529: TI99: 300/1200 BAUD
KNOTHEAD'S NOOK, Kent. WA 206-631-8056: Atari: 300/1200 BAUD
LIFE IN HIS WORD, Tacoma. WA 206-472-9331: LD: 300/1200 BAUD
LORDS OF DARKNESS, Bothell. WA 206-485-0665: C64: 300 BAUD
LORDS OF DARKENESS I, Kirkland. WA 206-821-3387: 300 BAUD
MAC CAVERN BBS, Seattle. WA 206-525-5194: Apple: 300 BAUD
MAPLE HILLS, Renton. WA 206-228-7533: C64: 300 BAUD: 6pm-10pm
MEANING OF LIFE, Kirkland. WA 206-827-9063: LD: 300 BAUD
MICRO MAGIC, Sumner. WA 206-863-1713: LD: 300/1200 BAUD
MINIBIN: KZOK/KJET, Seattle. WA 206-281-5656: TRS-3: 300/1200 BAUD: clsd 7am-11am
MINIBIN: ORBITER, Kent. WA 206-631-4381: LNW: 300/1200 BAUD
MINIBIN: ORBITER (FORWARDING -), Seattle. WA 206-932-2858: 300/1200 BAUD
MINIBIN: SATELITE SYSTEM, Seattle. WA 206-762-5141: TRS-1: 300 BAUD
MINIBIN: TRANQUILITY BASE, Seattle. WA 206-525-0497: TRS-3: 300 BAUD
MINIBIN: CHERYL'S VELVET TOUCH, W. Seattle. WA 206-937-2957: LNW: 300 BAUD
MR. ROGER'S NEIGHBORHOOD, Seattle. WA 206-522-8514: C64: 300 BAUD: 8pm-7am
MULTI PHREAKWENCY, WA 206-742-4280: 300 BAUD
MUSHROOM SHOP, Seattle. WA 206-527-8981: C64: 300 BAUD
NIGHTHAWK BBS, Van. WA 206-694-2852 *24
NORTH STAR T-ROOM RCP/M, WA 206-523-5355: 300/1200 BAUD
NORTHWEST CONNECTION, Seattle. WA 206-935-7530: Apple: 300/1200 BAUD
NORTHWEST MICRONET, Tacoma. WA 206-535-2837: LD: 300/1200 BAUD
OLD CHICAGO, DesMoines. WA 206-838-1815: Atari: 300 BAUD
PC BOARD: UNDERDOG, Seattle. WA 206-725-9233: IBM PC: 300/1200/2400 BAUD
PC BOARD: INFINITY BASE, Seattle. WA 206-329-9260: IBM PC: 300/1200/2400 BAUD
PC MATCH, Seattle. WA 206-935-5416: IBM PC: 300/1200 BAUD
PENITENTIARY, Lynnwood. WA 206-742-6942
PERNET BBS, Seattle. WA 206-782-6669: C64: 300 BAUD: 10pm-3pm
POLYNET PUBLIC SYSTEMS dsPPS, Seattle. WA 206-783-9798: Apple. 300/1200 BAUD
POLYNET PUBLIC SYSTEMS gsPPS, Seattle. WA 206-784-9776: Apple: 300/1200 BAUD
POLYNET PUBLIC SYSTEMS lsPPS, Lacy. WA 206-438-4477: Apple. 300/1200 BAUD
POLYNET PUBLIC SYSTEMS rsPPS, Seattle. WA 206-784-3217: Apple: 300/1200 BAUD
POLYNET PUBLIC SYSTEMS tsPPS, Seattle. WA 206-784-3218: Apple. 300/1200 BAUD
POWER HOUSE I, Bellevue. WA 206-453-4074: C64: 300 BAUD
PROTOSOFT, Seattle. WA 206-932-7125: IBM PC: 300/1200 BAUD
PUBLIC DOMAIN SILO, Lynnwood. WA 206-775-2650: C128: 300/1200 BAUD: 6pm-12am
PX, Seattle. WA 206-246-9627: C64: 300 BAUD: 6pm-6am
RBBS-PC: AUBURN, Auburn. WA 206-833-4183: IBM PC: 300/1200 BAUD: 6pm-12pm
RBBS-PC: ELECTRONICS SYSTEM, Renton. WA 206-235-8760: ZF-160: 300/1200 BAUD
RBBS-PC: HEPTITE GUILD, Mape Valley. WA 206-432-0650: Tava PC: 300/1200 BAUD
RBBS-PC: IBM-PC-UG, Seattle. WA 206-343-7843: 300/1200 BAUD
RBBS-PC: K.A.U.G., Silverdale. WA 206-692-8274: IBM XT: 300 BAUD: 5:30pm-9:30am
RBBS-PC: NIGHT SHIFT, Bothell. WA 206-488-0924: IBM PC: 300/1200 BAUD
RBBS-PC: PLANET CLAIRE, Seattle. WA 206-783-8037: IBM PC: 300/1200 BAUD: 5pm-10pm
RBBS-PC: PUGET SOUND, Lynnwood. WA 206-743-0162: IBM PC: 300/1200/2400
RBBS-PC: PUGET SOUND (SOUTHEND), Seattle. WA 206-281-7661: 300/1200/2400 BAUD
RBBS-PC: SEARS BUSINESS CENTER, Bellevule. WA 206-641-6265: IBM PC: 300/1200 BAUD
RBBS-PC: SEARS BUS. CNTR (Lynnwood), Lynnwood. WA 206-775-8412: 300/1200 BAUD
RBBS-PC: SEATTLE HOMEDOME, WA 206-946-1627: IBM PC: 300/1200/2400 BAUD
RBBS-PC: SHADOW, Lynnwood. WA 206-775-7409: IBM PC: 300/1200 BAUD
RBBS-PC: TRINITY, WA 206-778-3034: IBM PC: 300/1200 BAUD
REALM OF MOISTURE, Redmond. WA 206-882-9025: Atari: 300/1200 BAUD
REEF, Puyallup. WA 206-848-3371: LD: 300/1200/2400 BAUD
RIVERSIDE BBS, Bothell. WA 206-488-7551: Atari: 300 BAUD
ROUND TABLE II, Bellevue. WA 206-746-0829: TRS-4: 300 BAUD
SCRUNCHLAND, DesMoines. WA 206-824-4013: Atari: 300 BAUD
SEACOM-80, Seattle. WA 206-763-8879: TRS-1: 300/1200 BAUD
SHOOTING STAR, DesMoines. WA 206-838-7686: 300 BAUD
SHUTTLE EXPRESS, Redmond. WA 206-885-4636: 300 BAUD
SIXTY-FOUR EXPRESS, Kent. WA 206-852-9412: C64: 300 BAUD: 9pm-8am
SKYLINE, Seattle. WA 206-367-3697: Atari: 300/1200 BAUD
SKYLINE NORTHEND, (Alternate #) Lynnwood. WA 206-778-1143: 300/1200 BAUD
SOFTWARE SALERS, Seattle. WA 206-367-2026: TRS-3: 300 BAUD: 7pm-9am: *24 weekend
SPANAWAY USER'S GROUP, Tacoma. WA 206-531-0783: C64: 300 BAUD
SPEEDWAY, Seattle. WA 206-367-7509: Atari. 300/1200 BAUD
SS RIPTIDE, WA 206-546-8231: C64: 300 BAUD
SS TRADEWINDS, Tacoma. WA 206-752-2889: 300 BAUD
STALLEG XL, Seattle. WA 206-782-5534: Atari: 300/1200 BAUD
STARFLEET HEADQUARTERS, Seattle. WA 206-783-5589: Apple. 300 BAUD
STONEHENGE 1.21: AMIGA/OS9, WA 206-874-6381: Amiga: 300 BAUD: 5pm-8am
STONEHENGE 1.21: GOLDEN SUB, WA 206-488-0381: IBM PC: 300/1200 BAUD
STONEHENGE 1.21: J.J.'s, WA 206-632-1880: IBM PC 300/1200 BAUD
STONEHENGE 1.21: TWILIGHT ZONE, WA 206-745-2438: IBM PC: 300 BAUD
STONEHENGE 1.21: UNDERWORLD, Normandy Park. WA 206-244-6252: Compaq: 300/1200 BAUD
STONEHENGE 2.02: CKMCMS, Seattle. WA 206-329-0436: IBM PC: 300 BAUD
STONEHENGE 2.02: SANCTUARY, Bellevue. WA 206-747-6839: Compaq: 300/1200 BAUD
STONEHENGE 2.02: T.U.G. BBS (MPC5), Seattle. WA 206-632-0272: IBM PC: 300/1200 BAUD
STONEHENGE 2.02: TUKWILA STATION, Seattle. WA 206-244-0125: IBM PC: 300/1200 BAUD
TACOMA STAR TREE (TTST), Tacoma. WA 206-759-0615: LD: 300/1200 BAUD
TARDIS, Seattle. WA 206-329-2202: Datavue: 300/1200 BAUD: 6pm-8am: *24 weekend
TELE-MESSAGE 1, Seattle. WA 206-282-2482: C64: 300 BAUD: 5:30pm-11pm
TELE-MESSAGE 2, Seattle. WA 206-282-2482: Atari: 300 BAUD: 5:30pm-11pm
TELE-MESSAGE 3: COSMIC CONNECTION, Bellevue. WA 206-641-3705: C64: 300 BAUD
TELE-PIRATER64, WA 206-543-8714: 300/1200 BAUD
TELE-TRAVEL, Kirkland. WA 206-823-6091: 300/1200 BAUD
TICOMM, Seattle. WA 206-784-4142: TI99: 300 BAUD: Evenings
TIGERS LAIR, DesMoines. WA 206-874-4115: Apple: 300 BAUD
TOXIC BBS, Kent. WA 206-854-6147: Atari: 300 BAUD
TRIDENT BASE ONE, Bremerton. WA 206-698-2387: Apple: 300 BAUD
TRON, Bothell. WA 206-485-7784: 300 BAUD
UNIX BBS, Yelm. WA 206-458-3086; S-100: 300/1200 BAUD
USPS EXCHANGE, Seattle. WA 206-323-0711: C128: 300 BAUD
VIEWPORT (PAUG), Mercerls. WA 206-236-2246: Amiga: 300/1200 BAUD
WAVE NETWORK: RADIO 1, DesMoines. WA 206-878-0158: C64: 300/1200 BAUD
WAVE NETWORK: RADIO 2, DesMoines. WA 206-941-7649: 300 BAUD
WAVE NETWORK: RADIO 5, DesMoines. WA 206-838-0783: C64: 300 BAUD
WBBS: THE MISSING LINK, North Hill. WA 206-878-1823: Sanyo: 300/1200 BAUD
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FUNNY PHARM, CA 213-410-0221 *24
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ABBS Teledunjon I Dallas. TX 214-530-0858
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ANLN Dallas. TX 214-263-3109 *24
BBS-80 DALTRUG Dallas. TX 214-235-8784 *24
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COMPUTER RESET, Dallas. TX 214-272-7920; 300 BAUD
FAST TIMES, Dallas. TX 214-987-1278 *24
METROPLEX CP/M INTEREST GROUP RBBS/RCPM Plano. TX 214-867-2068 *24
MICROSERVE (TBBS), Tyler. TX 214-581-3722. 300/1200/2400 *24
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NET-WORKS Apple Shack. Dallas. TX 214-644-4781 *24
NET-WORKS Electric Computer Dallas. TX 214-239-5482
NET-WORKS Winesap Dallas. TX 214-824-7455
TBBS OF TYLER, Tyler. TX 214-566-1374; 300/1200/2400 BAUD; Atari. TRS-80. Kaypro *24
T.R.A.I.N. BBS, Ennis. TX 214-875-9818; Atari-AMIS Version

AMIS BBS. Pennsylvania 215-333-3753
AMIS Pennsylvania 215-250-9471
AMIS Pennsylvania 215-432-9848
A-NET EAGLE'S NET, Philadelphia. PA 215-969-3384
BULLET-80 Langhorne. PA 215-364-2180
CALTEX -16, Easton. PA 215-258-5235 *24
C.B.M. ONLY, West Lawn. PA 215-678-7691 300 BAUD *24
THE CITADEL, Philadelphia. PA 215-435-7018; 300/1200 BAUD *24
COMNET-80 North Wales. PA 215-855-3809

COMPCOM 215-968-0170 300/1200 *24
DISK DISPATCHER, Levittown. PA 215-943-3246
DS CAB, West Lawn. PA 215-678-7691 *24
GALATIC EMPIRE, Langhorne. PA 215-752-9746
HEMRES-80 Allentown. PA 215-434-3998
LEHIGH PRESS BB, PA 215-435-3388
LEHIGH VALLEY COMPUTER GROUP RBBS, 215-759-1376; 300/1200/2400 BAUD *24
NITE OWL 1, 215-285-6575; 300/1200 baud; *24
NITE OWL 2, 215-759-7347; 300/1200 baud; *24
NITE OWL 3, 215-266-9723; 300/1200 baud; *24
RBBS Pennsylvania. 215-398-3937
RBBS Pennsylvania. 215-836-5116
TECHIE, Easton. PA 215-252-8867; 300/1200 BAUD *24
TIBBS Philadelphia. PA 215-927-6432; 300/1200 BAUD *24
TI-LINE, Reading. PA 215-929-5348; 300/1200 BAUD *24
TI-TALK Reading. PA 215-372-1154; 300 BAUD *24

AKRON DIGITAL GROUP Akron. OH 216-745-7855 *24
AMHERST, Amherst. OH 216-988-8806
ARCADIA BBS Akron. OH 216-644-1014
ATARI Ohio 216-582-2797
ATARI EXPRESS Akron. OH 216-253-9247
ATARI PRISM Akron. OH 216-867-2422
BBS Computer Applications Poland. OH 216-757-3711
BIG BOARD (CP/M) Akron. OH 216-745-7819
BULLET-80 Chesterland. OH 216-729-2769
CAMELOT ATARI BBS Akron. OH 216-864-7002 *24
CLOUD NINE, 216-650-2989 *24
COMNET-80 Akron. OH 216-645-0827 *24
THE COMMODORE ARCADIA, 216-644-1014. 11pm-9am est.
COMMODORE'S BRIDGE Akron. OH 216-929-1454
COMMODORE CHIP Akron. OH 216-678-5033 *24
COMMODORE CLIPPER Akron. OH 216-928-4123 *24
COMMODORE COMMANDER Akron. OH 216-923-0347
THE COMMODORE CRUSADER, 216-864-8924 *24
COMMODORE EXPRESS Akron. OH 216-253-9247
THE COMMODORE GATEWAY, 216-896-9001 *24
COMMODORE RAINBOW Akron. OH 216-644-5771 *24
COMMODORE REALM Akron. OH 216-666-9463. 10pm-7am est.
THE COMPUTER EXPERIENCE, Cleveland. OH 216-946-9076 *24
COMPU-CENTER, Akron. OH 216-929-4803 *24
COMPUTER EXPERIENCE 216-946-9076 *24
COPLEY ATARI Akron. OH 216-666-8961
THE DARK TOWER Rogers. OH 216-227-3245 *24
FEDATA BBS, Cleveland. OH 216-476-1151 *24
FIRECOMM Akron. OH 216-666-0306
FIRESTONE PARK ATARI Akron. OH 216-724-7760
THE FOURTH DIMENSION, 216-644-4597 *24
FORUM-80 Cleveland. OH 216-943-2388; 300/1200 baud
THE GOLDEN KEEP, 216-896-9147 *24
HENRIETTA OUTHOUSE, Oberlin. OH 216-965-8151 8pm-7am
MEGA-FORCE BBS Akron. OH 216-699-9055
NEW AGE BBS Cleveland. OH 216-451-3280
NIGHT STALKER Akron. OH 216-376-6443
PIRATES DELIGHT Akron. OH 216-672-7580 *24
PMS Massillon. OH 216-832-8392 *24
PMS RAUG Akron. OH 216-867-7463 *24
RAILNET BBS Cleveland. OH 216-883-6298 *24
RBBS Lorain. OH 216-282-3423
RUBBER CITY ATARI Akron. OH 216-376-7618
S.T.A.R. BBS -1, Akron. OH 216-753-1199 *24
S.T.A.R. BBS -3, Akron. OH 216-753-5379
TBBS of Akron 216-724-2125 *24
TBBS OF SOUTH SUMMIT Akron. OH 216-724-1963 *24
TBBS OF TALLMADGE Akron. OH 216-633-7483 *24
TECHIE Cleveland. OH 216-944-1072
TELETERM 64, Lorain. OH 216-282-8848; 8:00pm-6:00am
TIMEX BULLETIN SERVICE, Parma. OH 216-661-4105
T/P RBBS, New Philadelphia. OH 216-364-3103; 300/1200/2400 baud *24
UNDERGROUND 64 Lorain. OH 216-282-8848 8pm-7am days
VICCOMM Akron. OH 216-896-0775 *24

ACELINE, Danville. IL 217-267-3530; 300/1200 BAUD *24
CENTRAL IL CONNECTION Riverton. IL 217-629-7006 *24
ICCC RBBS, Mattoon. IL 217-235-2000; 300 BAUD *24
THE INFO SYSTEM, Effingham. IL 217-342-3613; 300/1200 baud; 5:30pm to 8:30am; *24 on Sunday
NETWORK: ATARI, Rantoul. IL 217-892-8889
NET-WORKS C.A.M.S. Decatur. IL 217-429-5541
TRS-80 Effingham. IL 217-347-5884 *24
STARNET (ST ATARI NETWORK), Westville. IL 217-267-3530; 300/1200 BAUD *24

NORTH MINNESOTA APPLE LINE, Hibbing. MN 218-262-5746

FUNNY PHARM IV, CA 213-822-3553 *24
FUNNY PHARM V, CA 213-631-2911
FUNNY PHARM VI, CA 213-316-6033
GAMENET Palos Verdes. CA 213-541-8039 *24
GREENE MACHNE FRICASEED CHICEN, Arcadia. CA 213-445-3591
GREENE MACHINE Temple City. CA 213-287-1363
KANDY SHACK -3 Artesia. CA 213-402-1616
KLUGE COMPUTER 213-947-8128 *24
L.A. INTERCHANGE, Los Angeles. CA 213-631-3186 *24
LONG BEACH COMMUNITY COMPUTER 213-591-7239 *24
LYNZIE'S MOTHERBOARD, N. Hollywood. CA 213-659-1982 *24
MARINA MATCHUP, Los Angeles. CA 213-390-3239
NET-WORKS Coin Games Los Angeles. CA 213-336-5535
NET-WORKS Computer World Los Angeles. CA 213-859-0894 *24
NAVATION CO., Los Angeles. CA 213-881-6880
NET-WORKS Magnetic Fantasies Los Angeles. CA 213-388-5198
NET-WORKS Softwarx Los Angeles. Ca 213-473-2754
PASBBS Torrance. CA 213-516-7089 *24
PMS Los Angeles. CA 213-334-7614 *24
PMS O.A.C. Woodland Hills. CA 213-346-1849 *24
RBBS OF PACIFIC PABSADES Los Angeles. CA 213-459-6480 *24
RCP/M RBBS Downey. CA 213-861-2313 *24
RCP/M CBBS Pasadena. CA 213-799-1632 *24
RCP/M RBBS BBS Valley 213-360-5053
RCP/M RBBS Palos Verdes. CA 213-541-2503 *24
RCP/M RBBS Softwar Store Los Angeles. CA 213-296-5927 *24

THE WARGAMES RBBS, Santa Monica. CA 300/1200/2400. 213-393-9777*

AMIS Hart City. Elkhart. IN 219-262-3980
AMIS BBS Parlor City. Bluffton. IN 219-824-5198 *24
BBS 219-422-9180 *24
DARK CASTLE Warsaw. IN 219-269-5957 *24
ELKHART TOWNE CRIER Elkhart. Indiana 1200/300 Baud 219-875-8754 *24
FREMONT TOWN CRIER BULLETIN BOARD Fremont. IN 219-495-9747; 3:00pm until 8:00am on weekdays and 24 hours on weekends and holidays
LAKE COMPUTER DEPOT, TIBBS 219-659-5628 *24
MEGA NET BBS Mishawaka. IN 219-259-4366
TIBBS-LAKE COMPUTER DEPOT Whiting. IN 219-659-1245 *24

ARMUDIC Computer Age Baltimore. MD 301-587-2132
ATARI Severna Park. MD 301-544-2460
BBS IBM 300/450/1200 BAUD. 301-267-4930 *24
BBS IBM PC Rockville. MD 301-949-8848 *24
BLACK PATCH SYSTEMS 300/1200 Baud Atari 301-974-1274
COMMODORE MANIA! Potomac. MD 301-251-0599 *24
DARK STAR BBS, Baltimore. MD 301-444-1245 *24
ELITE SYSTEMS Atari. 301-974-4987 *24
HARVESTER BAPTIST CHURCH, Columbia. MD 301-995-0032
HEX Silver Spring. MD 301-593-7033 *24
HIDDEN REALM Glen Burnie. MD 301-768-1636; 300/1200 baud; Atari; *24
MYSTICAL FRONTIER (FIDO 468), Pasadena. MD 301-760-6187 *24
O'ZONE (DYM) Joppatowne. MD 301-679-6306
PMS Ellicott City. MD 301-465-3176
also Laurel. MD 301-596-0123
SALISBURY TOWNE CRIER (SALTC) Salisbury. MD 301-543-8845

ATLANTIS, Dover. DE 302-674-0859; Franklin Computer; 6pm-7:30am. *24 weekends
CONRAD'S FSCC Milford. DE 302-422-0923. 10pm-7am
KRICKIT Dover. DE 302-734-0179. 10pm-7am
LARRY'S ABBS Newark. DE. Voice 302-731-1583 Modem 302-737-7788
OOP'S DEPT., Dover. DE 19901 302-736-6616; 300/1200 baud; *24
OOP'S DEPT., (Line 2) 302-736-6613; 300/1200 baud; 9pm to 8am
TIBBS Newark. DE 302-322-3999

A.M.I.S. Denver. CO 303-978-0298 *24
A.M.I.S. Denver. CO 303-758-2927 *24
AMIS Denver. CO 303-758-6233
APPLE PI BOARD Denver. CO 303-469-7541 *24
AURORA-NET, 303-680-9292
AURORA NETWORKS Denver. CO 303-343-8401 *24
BAHA'I BOARD TBBS Denver. CO 303-449-3306 *24
BARDNET Ft. Collins. CO 303-493-1068
BBS IBM PC, Denver. CO 303-773-2699 *24
COLORADO DEPT. OF EDUCATION Denver. CO 303-572-1093 *24
COLORADO'S 1ST NOCHANGE!, Fountain. CO 303-382-8326; 300/1200 baud *24
COM-MART, Aurora. CO 303-695-0783 *24
COMM-NET Denver. CO 303-366-3898. 366-7177. 430-2473 *24
THE COMPUTER FARM Colorado Springs. CO 303-632-0660 *24
THE CONTROLLER BOARD TBBS ISLAND Denver. CO 303-690-9423
CP/M SIG RCP/M w/CBBS Denver. CO 303-465-1313 *24
DATA BANK Denver. CO 303-494-0167 *24
DATA-LINE Denver. CO 303-320-4102 *24
DATA LINK COMPUTER WAREHOUSE Denver. CO 303-934-3693
DENHUG BBS Denver. CO 303-423-3224 *24
DYM -118 THE BROKERAGE—THE BROKER Denver. CO 303-796-9721 *24
ELECTRIC MAGAZINE 303-340-2473 *24
ELECTRONIC LOCKSMITH—TOP SECURITY SYSTEMS Denver. CO 303-973-2167 *24
FIDO-NET Denver. CO 303-973-9338 *24
FIDO-NET GMCC (-77) Denver. CO 303-497-6968 *24
FIDO-NET -334 Denver. CO 303-497-6968
FRONT RANGE BBS (TRS-80) Denver. CO 303-772-7229 *24
FORUM-80 #2 Denver. CO 303-399-8858 *24
GOLD STRIKE BOARD Denver. CO 303-278-1487 *24
GULLIVER'S BOARD Denver. CO 303-690-1343 *24
HBBS Denver. CO 303-343-8401 *24
THE HOLLOW THE DRUID Denver. CO 303-329-6342 *24
I.D.S. STARCROSS Denver. CO 303-781-8212 *24
INTERCOMEX Denver. CO 303-367-1935 *24
INTRODUCTIONS UNLIMITED Pueblo. CO 303-544-1478; 6 to midnight on weekdays and *24 on weekends
PCjr-NET [5] JR-NET -4, (Englewood. CO 303-789-4610 *24
RCP/M CUG-NOTE Denver. CO 303-781-4937 *24
RCP/M RBBS Arvada Elec. Colorado Springs. CO 303-634-1158 *24
RCP/M RBBS Boulder. CO 303-499-9169
STAR BOARD ROCKY MTN 99ers. Denver. CO 303-455-3113 *24
SKYLINE, Northglenn. CO 303-457-0320 *24
VILLA TI, Colorado Springs. CO 303-574-2567; 300/1200 BAUD *24

GRAFIX CONNEXTION, Charleston. WV 304-768-9360; 300/1200 BAUD; Commodore 64 *24
NETWORKS ABBS Info International NW. Reedy. WV 304-927-1773
NET-WORKS Charleston. WV 304-345-8280
TRI-STATE AREA BBS Huntington. WV 304-429-3918
WEIRTON PERSONAL COMPUTER ASSOCIATION Weirton. WV 304-797-1302

ACES BBS, Ft. Lauderdale. FL; N. Broward/S. Palm Beach access: 305-390-2210 or S. Broward/N. Dade access: 305-431-5189; 300/1200 baud; *24
ADULTS ONLY I TBBS. Miami. FL 305-935-1136 *24
ADULTS ONLY II TBBS. Miami. FL 305-594-4526 *24
ALIEN UFO BBS, Titusville. FL 305-268-3690 *24
ALTERNATIVE UNIVERSE, 305-793-2975; Atari Only
AT-101-ES, Orlando. FL 305-281-0137; Apple
THE ATARI COMPUTER CLUB OF THE PALM BEACHES, 305-585-7879 3pm-8am
THE ATARI EXPRESS, 305-961-5221 *24
ATLANTIS, 305-920-6203 *24
AUTOBOARD -1-COMMODORE-Stuart Users' BBS (STUBBS) Stuart. FL 305-286-2509 *24
BBS Homestead. FL 305-246-1111
BACKSTREETS, 305-937-2838 *24
BBS, Vero Beach. FL 305-231-6435
BBS DIRECTORY, 300/1200 BAUD. 305-231-6435. 7pm-9am/24hrs weekends.
C-64 BBS! 305-238-2271. This is a Punter BBS
CABLE BOX, Pembroke Pines 305-432-5969 *24
CAVE, Hollywood. FL 305-961-8685; 300/1200 BAUD *24
CECIL'S NITE OWL Palm Bch.. FL 305-588-0487 *24
CHALKBOARD Hollywood. FL 305-962-6052 *24
COLOR BURST Ft. Lauderdale 305-525-1192 *24
COMM-LINK 99 (TIBBS), Altamonte Springs. FL 305-682-1526; 300/1200 BAUD
COMNET-64 (COMMODORE), Tamarac. FL 305-726-4390
CORAL REEF I, 305-432-2766 *24
THE CRYPT, 305-921-7252 *24
CRYSTAL PALACE (ATARI) 305-722-1697 *24
DIAL-YOUR-MATCH Sunrise. FL 305-741-2308
DR. DATA CBBS-RCP/M, Sunrise. FL 305-741-0835; 300/1200 BAUD *24
EL-SHIFT-OH Cocoa. FL 305-783-8905 *24
EMERALD CAVERN Hollywood. FL 305-981-4252
FORUM-80 Ft. Lauderdale. FL 305-772-4444 *24
FREEWAY XCHANGE BBS, (Commodore 64) Miami. FL 305-895-7727. 6PM to 12AM
GREENE MACHINE SPACECOAST 305-268-8356 *24
GREEN MACHINE SPACECOAST 2 305-453-6561 *24
MAGIC CITY WORLD OF TRON Miami. FL 305-264-9964 *24
MCM MICRO CITY Homestead. FL 305-247-6173 *24
MUGSY'S HIDEOUT, 305-961-3829 *24
NET-WORKS BIG APPLE Miami. FL 305-948-8000
THE NOTEBOOK, 305-655-4713
NOVA, Merritt Island. FL 305-453-0079 *24
ONE STEP BEYOND, Longwood. FL 305-831-0032
PARTY-LINE, Kissimmee. FL 305-847-2056; Atari *24
PC-RAIN/NODE IV Boca Raton. FL 305-994-3644
THE PINNACLE BBS, Hollywood. FL 305-922-4440 *24
QUILL, AMIS BBS Palm Bay. FL 305-724-2303
RBBS HEATH KIT 305-823-2281 6pm-8am
RBBS SOUTHERN MICRO 305-625-3181 *24
THE RAINFOREST BBS, 2400/1200/300 305-434-4927*
SCAUG BBS Merritt Island. FL 305-453-6998
SHADOW WORLD, 305-653-9856 *24
SPACE SHUTTLE BBS (SSBBS) Satellite Beach. FL 305-777-4714 *24
T.I.B.B.S. (CPU), 305-583-4343 *24
TBBS Orlando. FL 305-644-8327 *24
TECH-80 305-266-1032 *24
TELETERM 64 SOUTH, Lake Worth. FL 305-969-1958; Commodore
TIBBS West Palm. FL 305-793-8050
TRADE 80 Ft. Lauderdale. FL 305-525-1192
TRADE 80 of Miami 305-947-7930 *24
TRADE 80 Pompano Bch. 305-426-8080 *24
TREASURE QUEST Vero Beach. FL 305-562-1627 *24
UNICORN, AMIS BBS Palm Bay. FL 305-729-9575
W.S.C.P. World Society of Commodore Programmers. Ft. Pierce. FL 305-461-0403
YBBS The Heath Bar 305-940-8795 *24

SASKATOON TEXAS INSTRUMENTS BBS, SASKATOON. SASK.. 306-978-0182
SASKATOON TEXAS INSTRUMENTS COMPUTER CLUB, SASKTOON. SASK 306-384-2844

PET BBS Se Wyoming PUG 307-637-6045 *24

THE EXPRESS East Peoria. IL 309-699-6359 noon-11pm CST
NET-WORKS MAGIE Galesburg. IL 309-342-7178
QUAD CITY COMPUTER CLUB BBS, Rock Island. IL 309-796-0629 300/1200 baud *24
THE TRADING POST, East Moline. IL 309-755-6684; 300/1200 BAUD; 8pm-2pm
THE WAR-ZONE BBS, East Peoria. IL 309-699-0901

ABBS Chicago. IL 312-743-3153
ABBS Gamemaster. Chicago. IL 312-475-4884 *24
ABBS Lincolnwood. IL 312-764-6502
ABBS Rogers Park. Chicago. IL 312-973-2227
AMIS Boet. IL 312-462-9844
AMIS Chicago. IL 312-789-3610 *24
AMIS Lombard. IL 312-620-6441
ANLN Chicago. IL 312-253-9789 *24
The BASIC BBS Aurora. IL 312-896-9628 3pm-11pm; 300/1200 BAUD: TRS-80
THE BEAR'S DEN, Chicago. IL 312-561-2382
CBBS Chicago. IL 312-545-8086 *24
CBBS Chicago. IL 312-876-0974
CBBS Dolton. IL 312-849-1132
CBBS (Cache Lobo-80), Chicago. IL 312-384-2320; 6pm-8am weekdays. *24 weekends
CHICAGO SYSLINK, Chicago. IL 312-622-4442; 300/1200 BAUD *24
CLAUG 312-889-1240
CLAUG 312-457-2219
CLAUG 2 312-457-2219
CO-OP BBS Arlington Heights. IL 312-228-1495
CP/M Chicago. IL 312-326-4392
CP/M Chicago. IL 312-338-8827
CP/M Chicago. IL 312-861-1797
CP/M Downers Grove. IL 312-852-1305
CP/M Glen Ellyn 312-469-2597
DIAL-YOUR-MATCH -39 312-243-1046
DYM -110 Wilmette. IL 312-256-3995 *24
EL INFIERNO, Waukegan. IL 312-623-1545 *24
HCOM Chicago. IL 312-267-2066
HP1 Palantine. IL 312-397-8308
MACROPEDIA BBS, Lake Forest. IL 312-295-6926; 300/1200/2400 BAUD *24
MCMS C.AM.S. Chicago. IL 312-927-1020 *24
MCMS Hanover Park. IL 312-289-7619
MCMS L.A.M.S. Round Lake. IL 312-740-9128
MCMS Waco Hotline. Schaumburg. IL 312-351-4374 *24
MCMS Wheaton. IL 312-462-7560
NEETEX DATA BBS Chicago. IL 312-338-5830
NESSY Chicago. IL 312-773-3308
NET Arlington Heights. IL 312-392-2403
NET [5] Arlington Heights. IL 312-398-0970
NET [5] Chicago. IL 312-545-5866
NET Chicago. IL 312-685-9573
NET Chicago. IL 312-278-7261
NET Lombard. IL 312-627-5138
NET Wheaton. IL 312-260-0748
NET Skokie. IL 312-674-9246
NET-WORKS Chipmunk. Hinsdale. IL 312-323-3741 *24
NET-WORKS North Parks. Chicago. IL 312-745-0924
OCCCS #2 Wheaton. IL 312-588-7917
ORGASM! BBS, Chicago. IL 312-772-2452; 300/1200 BAUD *24
OT Berwyn. IL 312-795-0871
PBBS Co-Operative Comp. Palatine. IL 312-359-9450 *24
PCM Midlothian. IL 312-396-1022
PET BBS COMMODORE Chicago. IL 312-397-0871 *24
PMS Chicago Public Library 312-235-3200
PMS Chicago. IL 312-373-8057 *24
RIPCO 1200/300 BAUD. Chicago. IL 312-528-5020 *24
RCP/M AIMS Hinsdale. IL 312-789-0499 *24
RCP/M IBM PC Niles. IL 312-259-8086
RCP/M Logan Square. Chicago. IL 312-252-2136
RCP/M NEI. Chicago. IL 312-949-6189
SKI'S LODGE, Willowbrook. IL 312-282-9272
SYSLINK Chicago. IL 312-622-4442; 300/1200 BAUD
TBBS Chicago. IL 312-445-4545
TIBB Oak Park. IL 312-848-3669
UNIVERSITY CONFERENCE INFORMATION NET Chicago. IL 312-942-0089
WAUKEGAN PUBLIC LIBRARY SYSTEM BBS Waukegan. IL 312-623-2226
WILD BILL'S BBS, Chicago. IL 312-873-8360; Commodore 63 *24

ABBS Michigan Apple-Fone Southfield. MI 313-357-1422
AMIS A.R.C.A.D.E. Sterling Hgts.. MI 313-978-8087 *24
AMIS M.A.C.E. Detroit. MI 313-368-2064 *24
AMIS MACE. Michigan 313-274-3940
AMIS Michigan 313-544-0885
APPLE-GRAM 313-292-0389
THE ATARI ROCK PALACE Dbrn. Hghts.. MI 313-277-8632 *24
BBS Metro Detroit. MI 313-455-4277
CCCC BBS Canton. MI 313-981-5061
DAVY JONES LOCKER 313-764-1837
DETROIT RANDOM MATCH, Detroit. MI 313-541-7672
DIAL-YOUR-MATCH -37 313-736-1398
HEAVENLY MATCH, Detroit. MI 313-273-9551
HIGHWAY 61, Dearborn Hgts. MI 313-274-3206; Apple; 300/1200 BAUD *24
LAKESIDER DATA STATION Grosse Pte.. MI 313-881-7998; 110/300/1200 BAUD TRS-80 *24
LOVERS ON-LINE, Detroit. MI 313-849-0499
MC CBBS 313-243-4561 *24
NORTHERN GENESEE COUNTY COMMODORE BBS, Clio. MI 313-686-2780*
RCP/M Detroit. MI 313-584-1044
RCP/M MCBBS Keith Peterson. Royal Oak. MI 313-759-6569
RCP/M MCBBS TCBBS Dearborn. MI 313-846-6127 *24
RCP/M RBBS Southfield. MI 313-559-5326 *24
RCP/M RBBS Westland. MI 313-729-1905
SSBSS/STUDDS 30, Detroit. MI 313-284-3614
THE SERIAL PORT, Mt. Clemens. MI 313-286-0145 *24
SLIPPED DISC (RAVEXS), Detroit. MI 313-583-1243
SYSTEMS PLUS Flint. MI 313-742-6932
TIBBS Detroit. MI 313-288-0530
TIBBS Oak Park. MI 313-544-7788
TIBBS Warren. MI 313-751-1119
TREASURE ISLAND 313-547-7903
TWILIGHT PHONE 313 775-1649 *24
WESTSIDE DOWNLOAD Detroit. MI 313-533-0254

ABBS Century Next Computers. ST. Louis. MO 314-442-6502
ABBS St. Louis. MO 314-838-7784 *24
AMIS ComputerCave MO 314-432-7034
COMPUTER MERCHANTS FIDO, Jefferson City. MO 314-635-0887; 300/1200 baud; *24
THE JUNK DRAWER St. Louis. MO 314-837-2364 *24
MIDWEST St. Louis. MO 314-227-7120
NET-WORKS Computer Station. St. Louis. MO 314-432-7120
PET BBS Commodore Comm. Lade. St. Louis. MO 314-625-4576
TWILIGHT ZONE, St. Louis. MO 314-938-6288 *24

ILION DATA SCIENCE Ilion. NY 315-895-7951
MINI-SYSTEMS Walworth. N.Y. 315-986-5816; 300/1200 baud *24
PHCS-RBBS Parishville. NY 315-265-4422
SHAKLEE VITA-BOARD BBS, Utica. NY 315-793-0930 12pm to 8am.

ATLANTIS, Wichita. Kansas. 316-721-4339
BUSINESS PERSONS' LUNCH Wichita. KS 316-685-1205
C.S.W. 316-942-8746
COMMODORE BBS Wichita. KS 316-683-7848 *24
FORUM-80 Wichita. KS 316-682-2113 *24
GREAT INLAND SEA BBS 316-685-1188 6pm-8am
MOUSE EXCHANGE Wichita. KS 316-685-1190
OMEGA BBS Wichita. KS 316-685-8202
PANTHER I Wichita. KS 316-687-1268
SPECTRUM Wichita. KS 316-945-0882 *24
TIBBS Wichita. KS 316-681-3167
TIBBS Wichita. KS 316-681-3167 *24
UNION STATION BBS Wichita. KS 316-262-0819
W.O.P.A. Wichita. KS 316-683-0160
WOLF'S DEN, 316-838-9456
THE WOODSHED Wichita. KS 316-524-9069

THE ATARI HABIT BBS, Indianapolis. IN 317-899-1878 *24
BBS MESSAGE BOARD, C/P Tim Rivers 317-457-5576
C*H*U*G BBS, Greenfield. IN 317-898-5027; 1200/300 baud *24
THE COCO BULLET Indianapolis. IN 317-291-7827 *24
THE MUNCIE TOWN CRIER Muncie. IN 317-759-6893 *24
PMS Indianapolis. IN 317-787-5486
PMS SOFTWARE EXCHANGE Indianapolis. IN 317-251-7796 8:30pm-10am
SUPER-G.U. BBS, Lebanon. IN 317-325-2849 *24
THE TELETRON NETWORK, Crawfordsville. IN 317-866-1527

BAYOU TIBBS Lake Charles. LA 318-474-6144 *24
CBM-U COMMODORE Crowley. LA 318-783-2647 *24
DIAL-YOUR-MATCH -66 Layfayette. LA 318-233-7472
FORUM-80 Shreveport. LA 318-631-7107 *24
STAR (LINC) BBS Shreveport. LA 318-688-0522 *24
THE TOWNE CRIER BBS, Church Point. LA 318-684-3244 9pm-6am

ABBS Apple-Med.. Iowa City. IA 319-353-6528
COMPUCENTER IOWA 319-338-2750 300/1200 Baud Upload/Download
COMPUCENTER 319-338-2750 300/1200 BAUD *24
THE COMPUTER CELLAR Cedar Falls. IA 319-277-0646
DICK DAVIN REALTY Iowa City. IA 319-338-3947; 300/1200 BAUD *24
IBM PC Cedar Rapids. IA 319-363-3314 *24
SUNSHINE BBS/EXCHANGE, DUBUQUE. IA 319-557-9659 *24

AMIS Rhode Island 401-521-1998
NET-WORKS Computer City. Providence. RI 401-331-8450 *24
AQQUIDNECK TELETERMINAL (ATT), Newport. RI 401-847-8934 *24
NCCBBS I RI 401-847-8934 *24

Bulletin Board

PROTOTYPE -1 401-568-4163
PROTOTYPE -2:DRAG-NET 401-568-2343
PROTOTYPE -5:THE STAIRWAY 401-568-4164
THE SHORE BBS, Wyoming. RI 401-364-9788 *24
SYSLINK Providence. RI 401-272-1138

DIAL-YOUR-MATCH -23 402-571-8942
TRADE-80 Omaha. NE 402-292-6184

LETHRIDGE CAMING SYSTEM Lethbridge. AB 403-320-6923 RCP/M RBBS Computron Edmonton. Alberta. Canada 403-482-6854

ATLANTA COMPUTER SOCIETY, Atlanta. GA 404-934-1983
AUGUSTA TOWNE CRIER Augusta. GA 404-737-3333
BBS Atlanta. GA 404-435-9671
BBS IBM Hostcomm Atlanta. GA 404-252-4146
CBBS ATLANTA COMPUTER SOCIETY Atlanta. GA 404-636-6130
COMPUTER CORNER INFORMATION SERVICE La Grange. GA 404-883-7038 6pm until 10am daily
TBBS THE COLUMBUS CONNECTON; Columbus. GA 404-687-7309
TIBBS Riverside. GA 404-471-8824
NOCHANGE Roswell. GA 404-396-2517: 300/1200/2400 baud:*24
TERMINAL WANT ADS Chamblee. GA 404-458-4197
TIBBS Atlanta. GA 404-928-4278 & 404-471-1283
TIBBS Ringgold. GA 404-935-4054
TERMINAL WANT ADS INC. 404-458-4135 *24
TRI-STAR, Marietta. GA 404-587-2384

AMIS Oklahoma 405-681-6929
AMIS Oklahoma 405-685-2027
ARMU Oklahoma 405-722-5056
BIZZARO CITY 405-762-3297 *24
COCONET BBS, Midwest City. OK 405-376-1494 *24
CRYSTAL BALL, 405-765-7377 *24
DUCKNET, Lawton. OK 405-355-9678; 10pm-4pm Daily
HBBS Oklahoma City 405-848-9329 *24
THE LAND OF MACINTOSH Ada. OK 405-436-1792: 300/1200 BAUD
PATCHBOARD BBS, 405-762-9061 *24
RCP/M, 405-762-1651 *24
SECOND HAND SOFTWARE Oklahoma City. OK 405-942-2714 *24
TIBBS Oklahoma City. OK 405-672-8270
TAIPAN BBS, 405-765-2598 *24
TRADER'S HOTLINE, Ada. OK 405-436-6885 *24

BBS IBM PC Billings. MT 406-656-9624
LAKEVIEW BBS, Billings. MT 406-252-8586

AMIS Grafax Cupertino. CA 408-253-5216
AMIS ABBS San Jose. CA 408-298-6930
AMIS T.A.B.B.S. Sunnyvale. CA 408-942-6975
BBS -5 San Jose. CA 408-984-7937
BULLET-80 San Jose. CA 408-241-0769
BYTE BANDITS OF AMERICA TRS-80'S COMPUTER CLUB San Jose. CA 408-374-3974 Free access *24
COMPUCAT Los Gatos. CA 408-353-1836
DIAL-YOUR-MATCH -56 408-736-7356
EIGENWARE Saratoga. CA 408-867-6575 *24
GENDERNET Sunnyvale. CA 408-734-8727 300/1200 Baud *24
INFORMATION EXCHANGE SYSTEM -1 Sunnyvale. CA 408-733-1364 8pm-11pm weekdays. 24 hrs weekends/holidays
NET-WORKS Computer Emporium. San Jose. CA 408-227-0227
PMS Cambell. CA 408-370-0873 *24
PMS Santa Cruz. Aptos. CA 408-688-9629 *24
RCP/M Collosal Oxgate. San Jose. CA 408-263-2588
RCP/M RBBS Data Tech 004 Sunnyvale. CA 408-732-4231
RCP/M Silicon Valley. CA 408-246-5014 *24

ASTRAL RIFT BBS, Conroe. TX 409-273-5128; 300/1200 BAUD *24
CBM-U Commodore. Galveston. TX 409-763-1970
CABBS, Conroe. TX 409-760-1437 *24
SILVER STREAK, Vidor. TX 409-768-1444; Apple BBS/AE: *24
THE SWAP SHOP, 409-244-5154 *24

CBBS PACC Pittsburgh. PA 412-486-6277 *24
PENN-COMM BBS, Uniontown. PA 412-437-8286 *24
PGH L5 Pittsburgh. PA 412-366-6099 *24
PITTSBURGH ATARI COMPUTER ENTHUSIASTS BBS, Pittsburgh. PA 412-963-1355; 300/1200 BAUD *24
PUBLIC DOMAIN WAREHOUSE 412-364-6452: 300/1200 BAUD *24
USER COMMUNICATION SYSTEM/IBM-PC, Pittsburgh. PA 412-276-1269; 300/1200 BAUD *24

ABS Colortron Computer. WI 414-637-9990 *24
BIG TOP GAMES SYSTEM Milwaukee. WI 414-259-9475
CBBS Maude Milwaukee. WI 414-241-8364 *24
EXEC-PC IBM PC Milwaukee. WI 414-964-5160 *24
GRAND CENTRAL STATION, Waukesha. WI 414-547-0729; 9p-3p weekdays: 10p-10a weekends: EBBS
MEGA NET, Appleton. WI 414-731-4957 *24
OSHKOSH ON-LINE, Oshkosh. WI 414-426-5672
PET BBS S.E.W.P.U.G. Racine. WI 414-554-9520 *24
RAIN/SUE Oak Creek. WI 414-762-6411 *24
RCP/M RBBS Mike's Milwaukee. WI 414-647-0903
S.C.S. ABBS Lt. Suamico. WI 414-434-3253 8pm-7am
TIBBS Appleton. WI 414-739-5380
TIBBS Freedom. WI 414-788-9730
TI-MIL, West Allis. WI 414-259-0190
TBBS Canopus. Milwaukee. WI 414-281-0545 *24

ABACUS ONLINE - MODEL 100 USERS GROUP, Pleasant Hill. CA 415-939-1246 *24
ABBS Computerland. Fremont. CA 415-794-9314
ABBS Hayward. CA 415-881-5662
ABBS PCNET. San Francisco. CA 415-863-4703

ABBS South of Market. San Francisco. CA 415-469-8111
ALPHA CENTARI El Sobrante. CA 415-222-2858; 300/1200 BAUD *24
ARMU Synapse CA 415-527-8276
BBS Living Videotext Menlo Park. CA 415-327-8876 *24
BLUE BOSS IBM PC Berkely. CA 415-845-9462 *24
CBBS Lamda. Berkeley. CA 415-658-2919
CBBS Proxima. Berkeley. CA 415-357-1130
CONFERENCE-TREE -3 Hayward. CA 415-538-3580
CONNECTION-80 Fremont. CA 415-651-4147 *24
DIAL-YOUR-MATCH -10 415-467-2588
DIAL-YOUR-MATCH -17 415-991-4911
DIAL-YOUR-MATCH -56A 415-964-3255
DRUMMER 415-552-7671
ICB USED COMPUTER HOT LINE, 415-961-1431
KAY*FOG RBBS-RC/PM SYSTEM San Francisco. CA 415-285-2687
KINKY KUMPUTER San Francicso. CA 415-552-8268
MRCBBS 415-968-6501
OPEN CAMPUS ABBS, San Leandro. CA 415-577-3409 *24
P. BAY BBS San Francisco. CA 415-775-2384
PMS Pleasanton. CA 415-462-7419 *24
PMS Portola Valley. CA 415-851-3453 *24
RBBS DataTech 006. San Francicso. CA 415-563-4953
RCP/M BBBS Marin County. CA 415-383-0473 *24
RCP/M RBBS DataTech 001 San Carlos. CA 415-595-0541 *24
RCP/M RBBS Mountain View. CA 415-965-4097 *24
SUNRISE OMEGA-80 Oakland. CA 415-452-0350
SYSTEM/80 San Leandro. CA 415-895-0699
TIBBS San Francisco. Ca 415-355-3092
XT CLONE USER GROUP BBS, San Francisco. CA 415-552-9070 *24

BBS IBM Hostcomm Toronto Ontario. Canada 416-499-7023 *24
BBS THE BULL Toronto. Ontario. Canada 416-423-3265
EPSNLINK, Willodale Ontario Canada 416-635-9600
NETWORKS Toronto. Ontario. Canada 416-445-6696 *24
PET BBS PSI WORDPRO Ontario. Canada 416-624-5431 *24
PET BBS TPUG Toronto. Ontario. Canada 416-223-2625 *24
RCP/M HAPN Hamilton. Ontario. Canada 416-335-6620 *24
RCP/M MISSAUGA HUG Toronto. Ontario. Canada 416-826-5349 *24
THE CARSWELL CO. Ontario. Canada 416-291-8421
THE FRENCH CONNECTION BBS Niagara Falls. Ontario 416-575-2867

THE COMPUTER MATRIX Springfield. MO 417-869-5294
DGS*EXPRESS Springfield. MO. 300/1200 baud. 417-864-8546 *24
HOOTNEY'S HOLLOW Springfield. MO 417-865-0614 *24
THE INFORMATION BOARD Springfield. MO 417-887-6942
WEBB WRITERS ELECTRONIC BULLETIN BOARD Branson. MO 417-546-2118 *24

ABBS ABACUS II Toledo. OH 419-865-1594
ABBS COMPUTER STORE Toledo. OH 419-531-3845
COMMODORE'S BAND, Mansfield. OH 419-589-2567
THE LOST CAUSE BBS Crestline. OH 419-683-3463 *24
SOFTEX BBS, Findlay. OH 419-422-2313; 300/1200 baud *24

ARK-NET BBS Little Rock. AR 501-372-0576
C.I.A. BBS, Mayflower. AR 501-470-0624; Commodore *24
HILLBILLY HOLLER BBS, Botkinsburg. AR 501-745-2362; 300/1200 BAUD *24
PMS FT. SMITH COMP. CLUB Ft. Smith. AR 501-646-0197
RCP/M CBBS LR CP/M UG Little Rock. AR 501-378-7723-continuous; 300/1200 baud
WHBBS, West Helena. AR 502-572-2710; 300 baud *24

ALTAIR VI, Hopkinsville. KY 502-886-9089; 6pm-4am daily
THE FIFTH PRECINCT Louisville. KY 502-245-8270; 300/1200 *24
SAVAGE BBS, Ft. Campbell. KY 502-439-6968 *24
THE TRS-EXPRESS Louisville. KY 502-222-0913

ALTON RCP/M 300 Baud. North Bend OR 503-756-7883; 300/1200/2400 baud: *24
ATARI COMPUTER ENTHUSIASISTS 503-343-4352
CBBS NW Portlane. OR 503-646-5510 *24
CONNECTION-80 PAUG Portland. OR 503-281-7653
CELESTIAL SYSTEMS BBS, Portland, OR 503-233-0634 *24
FORUM-80 Medford. OR 503-635-6883 *24
IBBS, Portland. OR 503-292-1321
TIBBS Gresham. OR 503-661-0408
MICROTEXT 503-754-1376 *24
OARCS Portland. OR 503-641-2798
PMS COMPUTER SOLUTIONS Eugene. OR 503-689-2655 *24
PMS Portland. OR 503-245-2536
RCP/M Chuck Forsberg. OR 503-621-3193

THE ASYLUM, Sun. LA 504-886-3713 *24
THE BACK DOOR SOCIETY Baton Rouge. LA 504-292-3743 *24
THE BAT BOARD, Baton Rouge. LA. 300 baud. 504-928-7466 *24
BATON ROUGE DATA SYSTEMS Baton Rouge. LA 504-926-0181
THE BAYOU BOARD, Houma. LA 504-876-1790
CBBS Baton Rouge. LA 504-273-3116 *24
COMPUTERLAND OF HOUMA IBM BBS, Houma. LA 504-851-4586
THE CONNECTION BBS SYSTEM, Metairie. LA. 300/1200 baud. 504-834-2544
PCjr BBS Harvey. LA 504-366-0954 *24
THE CURTAIN CALL TBBS SYSTEMS, Houma. LA 504-851-4857 *24
FIREBASE XENON SEVEN Baton Rouge. LA 504-357-1886
K.U.G.N.O. BBS, Kenner. LA. 300/1200 baud. 504-832-8082 *24
LNW BBS SOUTHEAST Baton Rouge. LA 504-291-4331
NICHOLLS STATE UNIVERSITY BBS, Thibodaux. LA 504-448-2886
RIVER BEND NUKE NET 504-635-4394 *24
THE TRADING POST Baton Rouge. LA 504-291-4970
WBUG I, New Orleans. LA 504-368-4938
WBUG II, New Orleans. LA 504-348-4493
WASH 'N WARE Baton Rouge. LA 504-292-7353
WESTMINSTER MALL, Baton Rouge. LA 504-924-5092 *24

THE ALBUQUERQUE FIDONET BBS, Albuquerque. NM 505-898-2116 *24
BULLET-80 Alamorgordo. NM 505-434-1096
MTBBS, Hobbs. NM 505-392-2447
SANTA FE MESSAGE, Santa Fe. NM 505-988-5867; 300/1200 BAUD *24
SANYO BUGS BBS Albuquerque. NM 505-822-8268 10pm-10am daily
T.P. SANYO FIDONET BBS, 300/1200/2400 505-646-5194 *24

GUESTHAUS ATARI New Ulm. Minnesota 507-359-9187 *24 Monday-Friday
LOST GONZO BBS, Mankato. MN 507-388-1274 *24
TRI-STATE COMPUTER 507-376-6068 *24
XANADU St Peter. MN 507-931-4578; 300 BAUD

ABBS ROB ROY COMPUTER Yakima. WA 509-575-7704
FIRE HOUSE, Spokane. WA. 300 baud. 509-928-0939 *24
RCP/M RBBS Spokane Microcomputer Users Group 509-255-6324 *24

THE 64th PARALLEL/128th CONNECTION, San Antonio. TX 512-688-3129; 300-500/1200 baud: *24
C.C.S.U. NET 512-991-9382: 300/1200 BAUD *24
THE COMMUNICATION SYSTEM San Antonio. TX 512-822-6235
CONFERENCE-TREE Victoria. TX 512-578-5833
DATA ONE BBS 512-937-1302; 300/1200/2400 BAUD *24
DATABANK BBS 512-992-6441; 300/1200/2400 BAUD *24
DATABANK II 512-643-2251; 300/1200 BAUD *24
DAYTIMER 512-991-1343; 300/1200 BAUD *24
DIAL-YOUR-MONTH 512-451-8747
DRAGAONS LAIR 512-850-9400; 300 BAUD *24
FORUM-80 San Antonio. TX 512-655-8143
GROLOGIC/LROIS 512-854-7377; 300 BAUD *24
HACKERS AND PIRATES BBS, 512-297-5590
KCA BBS/RCPM 512-346-8876 *24
MR. ROGERS NET 512-854-0155; 300 BAUD *24
THE NET 512-854-9020; 300/1200 BAUD *24
THE OUTPOST 512-992-4782; 300 BAUD *24
POLARIS San Antonio. TX 512-650-0772
SATUG BBS San Antonio. TX 512-494-0285
SPACE CANTINA 512-884-5115; 300 BAUD *24
SUPERNET 512-991-5786; 300/1200 BAUD *24
ULTRALITE, San Antonio. TX 512-659-5470
WILLOW CREEK 512-643-2471; 300 BAUD *24

THE BEAR SWAMP BBS Marysville. OH 513-644-0714; 300/1200/2400 BAUD *24
THE CATHOUSE Cincinnati. OH 513-528-0707 *24
CBBS 513-825-4478 *24
CIN-SOFT 513-396-7467 *24
CIN-TUG (TRS-80) (TBBS) 513-474-2985
COCONUT Cincinati. OH 513-984-8705 *24
COMM-DATA 513-271-4274 *24
CRAB 513-738-4813 *24
LAZER BAY 1 513-777-6178 *24
PORTERONICS, Cincinnati. OH 513-474-4620
SOFTWARE PLUS 513-621-9273
THE UNDERGROUND, Dayton. OH 513-433-3232; Atari *24
XENET TELECOMM BBS, Xenia. OH 513-372-3373; 300/1200 baud: *24

CBM-U CONNECTION LaSalle. Quebec 514-365-9914 *24
CONNECTION-80 LAUAL BELE Laual. Quebec. Canada 514-622-1275 *24
DATAMATE Montreal. 514-645-9835
DISTRA-SOFT Montreal. Quebec. Canada 514-327-5764 *24
MICRO-DIAL, Montreal. Quebec. Canada 514-487-2792; 300/1200 baud *24
ON-LINE COMUPTERLAND Montreal. Quebec. Canada 514-931-0458 *24
TESTAMENT St. Laurent. Quebec. Canada 514-332-6852 *24

THE BANDIT'S BOARDWALK, Marshalltown. IA 515-753-8115 *24
C.U.N.I. BBS, Mason City. IA 515-424-8029 *24
NET-WORKS COMPUTER EMPORIUM Des Moines. IA 515-279-8863
TIBBS Knoxville. IA 515-842-2104
UPLOAD/DOWNLOAD ATARI, Marshalltown. IA 515-752-4099; 300 baud: 11pm Fri-6am Sat

ABBS PIRATES COVE Long Island. NY 516-698-4008
ADVENTURE BBS 516-621-9296
CBBS LICA LIMBS Long Island. NY 516-561-6590 *24
COLORAMA OF MIDDLE ISLAND Long Island. NY 516-924-6262 *24
CONNECTION-80 Centereach. NY 516-588-5836
CONNECTION-80 Great Neck. NY 516-482-8491 *24
DRAGON'S LAIR Hewlett. NY 516-374-5071
FALKENS MAZE BBS Long Beach. NY 516-431-3171; 300/1200/CAT202 *24
L.I.E.R., Long Island Epson RCP/M 516-536-1546; 300/1200/2400 baud *24
LION Long Island Osborn Network 516-567-8267
LNW BBS 300/1200 Baud Long Island. NY 516-924-9229
NET-WORKS PIRATE'S TREK 516-627-9048
STAR TREK III 516-569-0589 *24 run on ATARI 300/1200
TI SOURCE Long Island. NY 516-475-6463
W.A.B.S. Port Washington. NY 516-944-9821

BENCHBOARD BBS, 300 BAUD. 517-394-2447 *24
C.H.A.O.S. Lansing. MI 517-373-6788
CINET! Saginaw. MI 517-793-7407
THE CLUB NETWORK, 517-372-3131 *24
COMPUTRONICS, Greenbush. MI 517-739-7027 *24
CONNECTION-80 Lansing. Mi 517-339-3367
NORTH FOURTY, Oseoda. MI. 300 baud. 517-739-3352 *24

CAPITOL CITY BBS Albany. NY 518-346-3596 *24
COMP-U CRAFTS CBM CONNECTION Gloversville. NY 518-725-2173 9pm-8am est.
TIBBS Albany. NY 518-765-4993

APPLE-SPICE (NETWORKS II) Windsor. Ontario. Canada 519-945-3555 6pm-6am
CBM-U COMMODORE London Ontario 519-679-9101 *24
NORATECH ONLINE Windsor. Ontario. Canada 519-966-4334 *24

THE 64-CONNECTION Clinton. MS 601-924-1100
THE A & M CONNECTION, Biloxi. MS 601-374-5068 *24
APPLE GAME PLAYING SYSTEM Clinton. MS 601-924-0298
THE BLACKBOARD Jackson: MS 601-352-3591
BULLET-80 Hattiesburg. MS 601-264-2361 *24
C-64 GOSSIP CITY, Biloxi. MS 601-374-5068 *24
C.A.U.G. Biloxi. MS 601-388-3490
CONNECTION — RAVICS BBS Jackson. MS 601-981-1100 *24
GULF COAST COMMODORE BBS, 300/1200 Baud. 601-799-2494 *24
MICRO-COM CP/M Jacksonsville. MS 601-354-1239
NEW EXPRESS Columbus. MS 601-327-5062 Friday. Saturday. & Sundays 9pm-12pm
PAYTON'S PLACE BBS (COMMODORE), BILOXI. MS 601-388-3673 *24
REMOTE APPLE Jackson. MS 601-992-1918 *24
TI EXPANSION BBS Jackson. MS 601-352-5089

ABBS Phoenix. AZ 602-898-0891
A.C.C.E.S.S. Phoenix. AZ 602-996-9709 *24
A.C.C.E.S.S. Phoenix. AZ 602-957-4428 *24
A.C.C.E.S.S. Phoenix. AZ 602-274-5964
A.C.C.E.S.S. Scotsdale. AZ 602-998-9411 *24
ADAM 2 APPLE Phoenix. AZ 602-264-3800
BBS APOLLO Phoenix. AZ 602-246-1432 *24
CACTUS PATCH Yuma, AZ 602-344-8070; 300/1200/2400 BAUD *24
CBBS TSG Tucson. AZ 602-574-0327 *24
CBBS TSG Tucson. AZ 602-746-3956 *24
COCO PUB (059) Chandler. AZ 602-899-1350 *24
CONFERENCE TREE Clendale. AZ 602-931-1829
KANDY SHACK -4 Yuma AZ 602-342-2383
TWILIGHT ZONE (ATARI) Tucson. AZ 602-790-8805 *24

ACCESS 80 BBS NH 603-434-6225
ALTER-NET Laconia. NH 603-524-1000
CONNECTION-80 Peterborough. NH 603-882-5041
THE ELECTRONIC ORPHANAGE, 603-882-9312; 300/1200 BAUD *24
HUDSON BBS NH 603-883-2862
JOE'S ASYLUM, Dover. NH 603-742-0250
KEENE BBS NH 603-357-4306
NET-WORKS Portsmouth. NH 603-436-3461
P.E.R.C.S., Greenville. NH 603-878-2642
QUAGMIRE (ATARI) Portsmouth. NH 603-433-1859 *24
SOFTWARE REFERRAL SERVICE 603-625-1919
SPECTRE BBS (ATARI) Portsmouth. NH 603-436-7475

ABBS Vancouver. BC 604-437-7001
CBBS Prince George. BC CN 604-562-9515
LANDS END RCP/M, Sidney. British Columbia 604-656-9115
RCP/M CBBS Frog Hollow. Vancouver. BC. CN 604-873-4007
RCP/M RBBS Surrey. Vancouver. BC. CN 604-584-2643
RCP/M Terry O'Brien. Vancouver. BC. CN 604-584-2543

DOCS BBS, Rapid City. SD 605-923-3727: Atari: 300 baud: Friday 11pm to Sunday 5pm

BBS Lexington. KY 606-273-1920
BILL-BOARD 606-371-9219 *24
DATANET Cincinnati. OH 606-727-3011
NKUBBS/PMS Cincinnati. OH 606-572-5685
THE RUPPEL-SET TBBS Cincinnati. OH 606-291-9255
SOFTWARE WAREHOUSE BBS, Nicholasville. KY 606-223-4821

"THE COMMODORE DOMAIN" Ithaca. NY 607-272-4060 9pm to 7am on weekdays. 6pm to 7am on weekends
SUNY BBS, Binghamton. NY 607-777-3258; 300/1200 baud: TRS 80 Model 4: *24
TOWN CRIER BBS Binghamton. NY 607-648-2366

BITS II, Madison WI 608-255-2755 *24
ELECTRIC MAGAZINE, 608-784-6500; Commodore C-64 based *24

ABBS Turnersville. NJ 609-228-1149
THE CASINO RBBS-PC, Atlantic City. NJ 609-652-6030; 300/450/1200/2400 BAUD
THE CAVE BBS, W. Trenton. NJ 609-882-9195; 300/1200 BAUD *24
DANTE'S INFERNO Glassboro. NJ 609-863-0005; 300/1200/2400 BAUD
GANDALF BBS Plainsboro. NJ 609-799-4643
GREENE MACHINE Voorhees. NJ 609-429-4542 *24
KMMM PASCAL BBS Bellmawar. NJ 609-232-0773 *24
MILLIWAYS Princeton. NJ 609-921-1994
RATS Wenonah. NJ 609-468-5293
RATS Wenonah. NJ #2 609-853-8268
THE RATS NEST BBS 609-261-5498
RBBS THE COMPUTER CONNECTION, Voorhees. NJ 609-784-9404 *24
THE TARDIS BBS 609-448-1361
TARI BOARD Maple Shade. NJ 609-234-9240
TGIF-THE FRANKLIN USERS BBS, Blackwood. NJ 609-228-7456
THE VOORHEES Z-NODE, Voorhees 609-428-8864 *24

ABBS Calvary Memorial Church 612-472-3895 *24
ABBS Calvary Mission Church. MN 612-471-0252
ATARI BARN, Minneapolis. MN 612-521-5398; 300/1200 BAUD *24
BBS Richfield. MN 612-869-0054
CAPTAINS LOG APPLE NETWORKS 612-377-7747
CBBS Richfield. MN 612-423-5016
COMMODITIES/ABBS APPLE 612-333-8970
COMPUTER PLACE TRS 612-869-3246
CONFERENCE TREE -17 APPLE 612-854-9691 *24
ERIK'S NET NETWORKS-APPLE 612-920-3975
GOLIATH MCMS TRS 612-753-3082
HEATHKIT ZENITH 612-778-1213
JOB SYSTEM, THE NETWORKS, APPLE 612-542-9597 *24
KNIGHTS OF THE ROUNG TABLE 612-457-4139
L5 MINNESOTA SPACE BBS, 612-920-5566 *24
LAWSIG 612-872-2352
LOCI'S-NET 612-571-5965
MARIO'S HIDEOUT 612-645-0826
MASTER CONTROL 612-473-6668
MCMS MC SOFTWARE Minneapolis. MN 612-533-1957 *24
NC SOFTWARE 612-533-1957
PC TURNING POINT 612-926-5666; 300/1200 BAUD *24
PCjr-EXPRESS MN 612-644-6302 *24
PIRATE ISLAND 612-825-5852
PIRATES PLACE 612-781-9266
PMS Minneapolis. MN 612-929-6699
PMS Twin Citiea 612-929-8966
SAFEHOUSE 612-724-7066
SIMPLE SIMON 612-432-0428 *24
SIMPLE SIMON RBBS Apple Valley. MN 612-432-8403
TC-AMS Minnetonka. MN 612-938-4799 *24
TCO NARNIA, New Brighton. MN 612-636-6228
TERMINAL STATION 612-423-5048
TWIN CITY ATARI INTEREST GROUP 612-432-3779
UNITED RBBS 612-731-1063

ABBS COMPUMART Ottawa. Ontario. Canada 613-725-2243

THE BANDIT Westerville. OH 614-895-7209
BULLET-80 Ironton. OH 614-532-6920
C.O.R.E. RBBS/RCPM Reynoldsburg. OH 614-864-2673 *24
DELAWARE COUNTY Delaware. OH 614-363-1018 *24
THE DISK EXCHANGE BBS, 614-369-2636 *24
DR. DOWNLOAD Granville. OH 614-587-3774 *24
ELECTRIC CHRONICLE New Albany. OH 614-855-1026 *24
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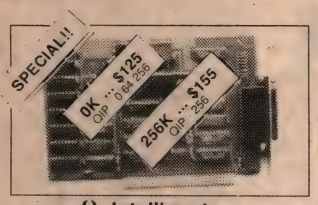
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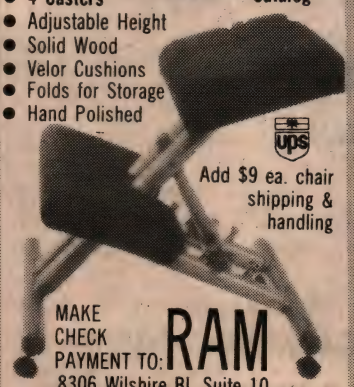


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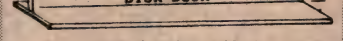
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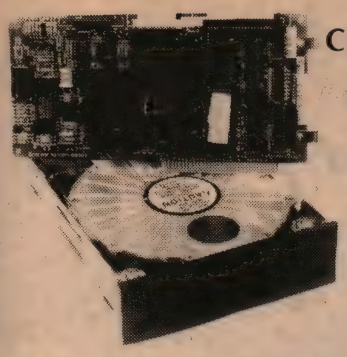
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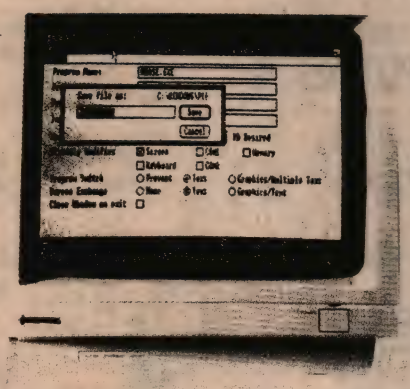
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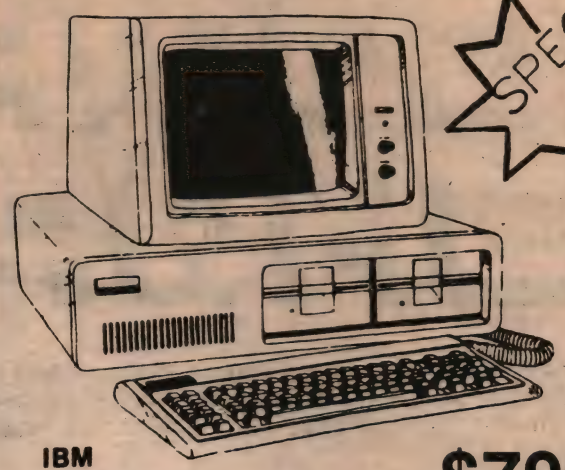
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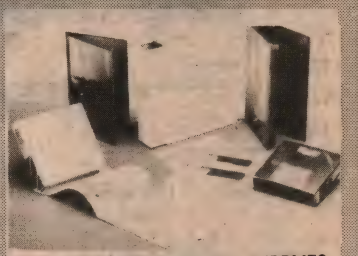
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CLASSIFIED

CLASSIFIED INFORMATION

The classifieds are for **Pre-Owned Items & Software ONLY.** New equipment, Services, etc. must use regular Display space.

Instructions

In order for us to keep the ad rate low and insure accuracy, it is necessary that the following procedures are followed.

1. Type or print your ad legibly on a plain sheet of paper. Ads received that are difficult to read will be returned.
2. Write the desired category at the top of each ad. Please refer to the index, this page, if a category is not indicated, ad will be placed in the Miscellaneous section.
3. If more than one ad is submitted, use a separate piece of paper for each ad, making sure your complete name and address is at the bottom of each ad.

CLOSING DATE — 2nd Monday of the month. Example: Ads received by the 2nd Monday of June will appear in the August issue. **Due to our low rates, you cannot change, cancel or receive a refund on classifieds after they are typeset.** In most cases, ads are typeset within a week after they are received.

RATES

Subscribers: 25 cents per word. $5.00 per ad minimum charge. The first two words (if underlined) will be set in bold face at no additional charge. Bold face or all cap words thereafter will be fifty (50) cents per word. Special bold headings, partial lines, open space or leader dots are:

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Ads running more than one time. A repeat ad will be coded at the end of the ad with month the ad started and issue ad ends. Example: 8-160. Ad started Aug. ends 160 issue or January. NOTE: Please check to make sure your ad has been correctly coded.

PROOFS

Due to low classified rates a free checking copy or tear sheet cannot be sent if proof of insertion is desired, please send $3.00 extra.

PHOTOS

A photo will draw attention to your ad. Photos are $7.00 per column inch. Please send in B/W photos, preferable 4x5's cropped horizontally. Include your name and address on the back of **each** photo. If photo looks like it is more than one inch send in money for two inches or more.

★ $5.00

★ $4.00

★ ★ ★ $3.00

STARS

Have a special piece of equipment to sell? Reducing the price of an item and want to attract attention to that fact? Take advantage of our low price "star" attention getters.

It's a fact...unusual "artwork" in or above an ad draws attention to that ad and the reader retains interest in that product longer.

Get Response Quicker with "Stars" above your ad. Above is the rate for different sizes. Just mark "stars" and the price of the one you choose above your ad copy and we'll take care of the rest. Be sure to include the cost with your ad payment.

CS-ABREVIATIONS

add-post ..... add postage
add-post-AP ... add postage, all prices
FC ..... Freight Collect
MBG ..... money back guarantee
PP ..... postage paid
SASE ..... send self-addressed stamped evelope for check return or information requested
10 DRP ..... 10 day return privilege
CCR ..... check clearance required

EXAMPLES OF STYLES:

Normal

PDP 11/03 COMPUTER
Complete **OPERATING SYSTEM** with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000, or separate at:
11/03 Computer $900
Dual RZ-1 disc $1,000
32KB memory $2,800

PDP 11/03 COMPUTER. Complete operating system with RT-11 system software plus basic. Brand new October '78. Sell complete at $7,000 or separate at: 11/03 Computer $900, Dual RX-1 disk $1,000. 32KB memory $2,800. VT-52 video $1,000, GE Terminet 30 printer $800. Intertube video terminal $400. **John Doe,** POB 1234, Somewhere, USA 00000. 123-456-7890.

10 Point Centered Head

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1 TRS 16B Multi-User Xenix based system with 6800 processor and 512K. Includes 2 (DT-1) terminals and 12 meg. harddisk. Complete system for (3) users with all cables and interfaces. Software includes: cobol, Multi-Plan, TRSDOS, Xenix, ASM-16 and V1 (Editor). Total package for $3500. **Call 615-821-4248.**

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1-800-TECTRAN

800-832-8726
VISA/MC Accepted ● 401-467-8888
6-79

Color Computer, 64k, Extended BASIC, will drive color TV or composite monitor, lots of free goodies; all for $100 (plus $10 shipping). Also 32-column thermal printer for CoCo only $45 (plus $5 shipping). Free shipping with purchase of both computer and printer. Also "Briteface" parallel printer interface for CoCo for $30 (cost $55). Also Panasonic printer to complete system. **Gary Smith, 615-885-3831,** after 6; No collect calls.

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Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

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For Sale: Seldom used/Tandy **Model 100 (32K), Disk-Video Interface,** Tandy carrying Briefcase, TTX press portable printer, DISK+, ROM+, numerous software e.g. Portable Accountant, Disk Buddy Ect. Firm $1,000 or Trade for IBM Compatible. **George, 1-213-560-2216.** 5-78

LNW-80 Computer: 48K, LNW-5/8 Doubler - supports 5"/8" drives Single/Double sided, single/double density including TECHNICAL REFERENCE MANUAL, $275; with 2 drives, NEWDOS80/v2.0 & DOSPLUS/v3.5 $395; FORTRAN $40; Newscript word processor $40; ALLWRITE word processor $85. **M. Bickerton,** 47 Birchwood Court, Tinton Falls, NJ 07724. **201-842-3762.**

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Godfather's used computer SYNDICATE

$$$$ We have a limited selection of Model I's, II's, III's, IV's, 12's, 2000. We give a full 90 day warranty. BUY—SELL—TRADE. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

Model 100 32k, d.c. modem cable, printer cable, AC power supply. MX-80 printer, stand and paper. Like new. Access free software via Compuserve. $650 or offer. **Thom Wright,** 6700 W. St. Paul #1, Milwaukee, WI 53213.

Model 100, 32k, removable RAM, no LED screen, otherwise perfect $179; Also 8k RAM module for PC-2 $75. **Thomas Sovinec,** Box 4235, Santa Barbara, CA 93140.

Model 100 w/24k, all instruction books, LN, $325; **Model 200, 24k, all instruction books, LN $599; Model IV** w/64k, dual disk drives, EX $499. AP to NS postal money order SASE to: **Vaughn Williams,** 5700 Overbrook Ave., Philadelphia, PA 19131. Tel: **215-473-3133.**

Model 16/2 Drive, DMP500 & DWII (tractor) Printers--Low Usage. 21 RS software packages, $5000 or best offer. **Homer Dyer, 601-494-5732.**

Model-4P with two drives, 9" monitor, carrying case, Never used, $600 or offer. **Patrick Sheehan,** 6125 160th St., Prior Lake, MN 55372. **612-447-8305.**

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Models 12 & 4P Like new, $1200/$800, 2 drives per system + manuals. Model II keyboard $50. **516-599-5745.** 6-81

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INCLUDE 25 CENTS PER WORD FOR YOUR NAME AND ADDRESS FOR SUBSCRIBERS AND 50 CENTS PER WORD FOR NON-SUBSCRIBERS.

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TRS80 MODEL 16. Will support UNIX and multiple terminals. Lightly used. Includes TRSDOS 2.0B, Scripsit & dictionary, Profile, Visicalc. Asking $4000. Call **Mr. Noah Flucard 904-795-2362.** 5-78

TRS-80 MODEL IV. Dual Disk drives. 64K. DWP410 letter-quality printer with tractor feed. SuperScripsit word processing software and Videotex telecommunications software. 300 baud modem. Complete system $1995.00 O.B.O. Call 305-784-6071 after 6 PM EST or write Sizemore, 703 Bermuda Rd., Cocoa Beach, FL 32931.

TRS-80 Model II. 3-Bay expansion with second drive, Daisy Wheel II, letter quality printer, Profile, Scripsit, General ledger, more. Used in home $1800. **813-283-5355.** 4-77

TRS-80 Model-1 mint condition, 48k expansion interface and manual, double density kit, RS232 $500. **603-888-1376** evenings EST.

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Tandy 2000 MS-DOS. 512K memory, VM-1 mono monitor, like new $900. **Len, 212-777-4353.**

(102) TANDY COMPUTERS WANTED

★ ★ ★

Frustrated Tandy 2000 Owners Wanted! Tired of Tandy's lack of response and broken promises regarding MS-WINDOWS or software compatibility, availability and upgrades/support? Want to take positive action? Please contact me with the details of your problems. **Jim Cassoutt,** 7309 Sachem Road, Pensacola, FL 32506.

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$$$$ I BUY, Sell, & trade TRS-80's for cash. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

Wanted: Model II with printer and extra drives. Harold George, Mt. Vernon Clinic, Mt. Vernon, MO 65712. Phone417-466-7191. 5-77

Wanted: TRS-80, Mod. I with at least one double density controller. **James Dawley,** 1017 Coconut Ave., Sarasota, FL 33577. **813-955-3721.**

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Character Generator for Model III or IV. These character generators double the number of displayable characters. Absolutely no hardware modification is necessary - simply pull out your old chip, and put the new one in. $20 gets you the chip and complete installation and operating instructions. Specify script or scientific set or send SASE for more info. Custom character sets can be arranged. **CPU International,** 11604 Starlight Ave., Whittier, CA 90604. 6-80.

★ ★ ★

Color Computer programs for only 50¢ each! Many Machine language! Send $5 for 10 programs on tape or disk or write for free catalog. **Coco Software,** PO Box 256-C, Holland, MI 49423. **616-396-7577.** 5-79

Deskmate for model 4/4P/4D, unused with manual/registration $75; DOSPLUS/v3.5 $60; FORTRAN $40; NEWSCRIPT word processor $40; ALLWRITE word processor $85; TALLYMASTER financial analysis program $35. **M. Bickerton,** 47 Birchwood Court, Tinton Falls, NJ 07724. **201-842-3762.**

Domain/Commercial Software! Tandy 1000 owners-Access our 1000+ disk library. Diskfull Software (DS/DD) for PC/Clones - Rent $1 - Buy $3 (including disk). **804-851-6864. Colony,** Box 808, Langley AFB, VA 23665. 6-78

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Earn $1100 per Month with your TRS-80, Apple, Commodore or IBM compatible. This program will allow you to enjoy a handsome full or part-time income working in your own home and setting your own hours. This unique program has been tested and used for over **seven** years and its service has had phenomenal acceptance. We provide all the know-how, the consultation service, and all the materials needed to make this unusual business opportunity a success from the first day. If you like the idea of operating a highly profitable business out of your own home, if you like working with a computer, and if you like making money, then this could be the opportunity you have been searching for. All you need is your TRS-80, Model I, III, IV or 1000, with your Apple or Commodore computer with or without disk drives, a minimum of 16k memory, a reliable printer, and the desire to turn your micro into a highly profitable home business enterprise. For complete details, send $10 (VISA, MASTERCARD and **AMERICAN EXPRESS** honored) to: **Viking, Inc.,** 910 Soo Blvd., Rice Lake, WI 54868. Ask for "OPPORTUNITY 86"

Entire KJV New Testament in pure ASCII text files, $29.95. Specify format: TRSDOS 1.3, TRSDOS 6.2, CP/M Plus, or MS-DOS 2.11. **Fax Plus,** PO Box 206-C, Derry, PA 15627. 5-78

FREE PROGRAMS!!
TRS-80-coco/TRS80-III/TRS80-4/TRS80-100/TRS80-200/TRS80-MC10/TRS80-pc3/Adam/IBMpc/Commdores. Send postage stamps. **EZRAEZRA,** Box 5222-PRMY, San Diego, CA 92105.

★ ★ ★

Get Rich with your micro computer! learn how to cash in on this billion dollar industry. For free details write: **Premiere Books,** 5798 Fenwood Ct., Mentor, OH 44060. 6-82

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Handwriting Analyzer, Hangman, States And Capitals, Drawing Board, Free Information, **CTL Co.,** 115 Bixby Drive, Milpitas, California 95035. 8-78

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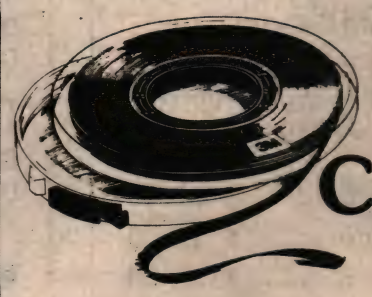
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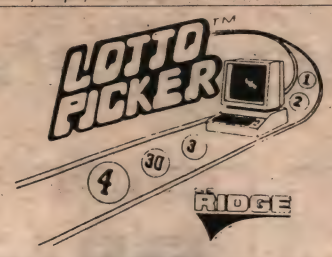
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The only interactive debugger for the Extended BASIC programmer! This powerful utility is completely transparent to the Extended BASIC environment and can be instantly accessed with the touch of the HOT KEY, without disrupting the current program in memory. Functions include listing variables, finding variables, reserved words, text strings, call statements, data and deleting blocks of lines. All functions operate when you want, while you are programming! Requires Extended BASIC, memory expansion and disk system. $19.95 postpaid. **Texaments,** 53 Center Street, Patchogue, NY 11772. **516-475-3480.**

(105) ALTOS COMPUTERS FOR SALE

8000-12 20 meg. harddisc, three televideo 925 terminals, tape backup, open systems, AR/AP, $3,700 like new. **201-233-4600, Jim G.,** Manasquan, NJ 08736.

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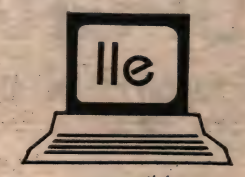
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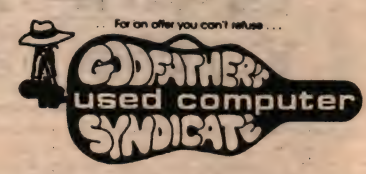
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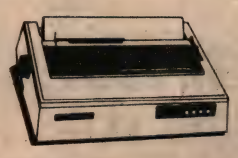
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This is a fully integrated five module accounting package with General ledger, Accounts Receivable, Accounts Payable, Payroll, and Inventory. The system requires an Apple II compatible computer, printer, dual floppy drives, or hard disk. The system is menu driven and comes with a manual. Training and custom modification are available. **Custom Software Support Systems,** 233 Maplewood Ave., Youngstown, OH 44471. **Phone 216-755-1650. 6-79**

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APPLE CP/M PUBLIC DOMAIN. Modem7 terminal program assembled for your Apple. Lets you download CP/M programs $7 postpaid. Specify equipment. Free list of CP/M Public Domain, Diskette conversin to and from Apple, IBM, and CP/M send for list. **Softhaus,** Box 4150-CO, Vero beach, FL 32964. **305-231-0912. 4-77**

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Design continuous labels for home or business. Lables for disks, mailing, name badges, file folders, photos, etc. Design labels on screen or select from most often used labels. Works with Scribe, Imagewriter, Okidata ML-92, and Epson MX-80. 100 free labels, PGM, and manual $15.50. (Not copy-protected). **R. Miller,** 5539 Whistlewood Ln., Charlotte, NC 28208.5-78

MANUALS & SOFTWARE

These are the original, hard to find manuals and software you need: ProDos Users Kit (A2D2010) with ProDos System disk $35; Apple II Utilities Guide (A2D2053) with ProDos System disk containing 64k and 128k Utilities $35; Apple IIe (enhanced) Owner's Manual with introductory disk, 192 pages, $18; Apple DOS 3.3 User Manual (A2L2002) $16; Apple DOS 3.3 Programmer's Manual (A2L2012) $12; Add UPS, $2 first, $1 each additional. Request 8 page flyer. **Electrovalue,** Box 376-CM, Morris Plains, NJ 07950. **201-267-1117,** M-F, 10-5. 5-87

-APPLE MISCELLANEOUS-

Appleworks: Like New $100; ALS CP/M3.0 Card 6MHz Z80, 64K + Programmer's kit $125; Apple II Disk Controller $30; Apparat EPROM Blaster $65; Expanda-RAM 16K $20; heuristics H2000 Voice Recognition $50; Mountain Computer Supertalker $50; Mountain Computer Introl/x-10 BSR Controller $25; quadlink Emulates Apple II on IBM PC $200; Novation Auto-Cat External Modem $50; Amdek DVM-III RGB $75, add post. **Mark Goldstein,** PO Box 825, Tempe, AZ 85281. **602-437-1767** (eves).

APPLE PASCAL users. Pop-up *Monitor, versatile *Edit, *Util and other programs. **dogStar Software,** Box 302, Bloomington, IN 47402. 3-83

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Apple II + /IIe boards $49 each; **EPROM Programmer,** programs thru 2764. **Super Serial** board, simular to Apple Super Serial card. **Graphic parallel** board w/cable, simular to Grappler + . **II + 80 Column Board,** simular to Videx. Add $2.50 shipping. **Nexo Distribution,** 8824 Golf Drive, Spring Valley, CA 92077. **619-589-7928. 4-77**

Apple II + Integer ROM Board w/Manuals. In original box w/warranty, several avail. $39 + $2.50 shipping. **Nexo Distribution,** 8824 Golf Drive, Spring Valley, CA 92077. **619-589-7928. 4-77**

Apple IIe 64K, 80 column card $47; 256K 80 column card $174; 5¼" Disk drive $175; System Saver $36; 80 column card II + $110. Call **Kevin Smith, at 716-487-1563. 5-78**

Apple IIe 64K/80 Column Board. Brings total IIe memory to 128K. 40/80 column softswitch, Double High Res. Graphics. Complete IIe software compatability. **Money Back Guarantee.** $39 + $2.50 shipping. School PO's Okay. Discounts available. one year warranty. **Nexo Distribution,** 8824 Golf Drive, Spring Valley, CA 92077. **619-589-7928. 4-77**

Apple IIe, IIc owners wanting to swap software. Send your list to receive mine. **JC,** 100 Wintergreen Lane, Stafford, VA 22554.5-77

Apple IIe screen editor $77.95; Get this new, essential upgrade for much less than the price charged by Apple's dealers. No more insertion VIA "Escape Sequences". Provides the editing functions found in the PC. **Vector Systems,** Box 38, Angleton, TX 77515. **409-848-1126.** Check, MO, VISA, MC.

Apple MacIntosh, Apple II, and Apple IIc schematics ready for your inspection. A must for any Apple owner. Priced from $12 to $29. **214-247-5881, Computer Solutions of N.T.,** PO Box 810045, Dallas, TX 75381.

Apple Public Domain software $2.50 a disk or you furnish disk $1 each side plus $2.50 shipping. Blank disks available for $9.50 for 10; Send $2 for catalog and get a free disk of software with your software or disk order. Mac Public Domain software $4 a disk plus $2.50 shipping. Blank disks available. Send $3 for catalog and get a free disk of software with your software or disk order. We also carry brand name software. A listing sent with above catalog or if requested sent separate. We also handle Apple compatible computers & hardware. Ask for more information and price list. Send check (CCR) or m.o. (U.S. Funds only) to **B&L Consultants & Sales,** Box 461, Wabash, IN 46992. 5-77

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Apple Public Domain X-rated adult games with high resolution pictures two disks $24; Aviation data base and slide show two disks $24; Radio and Electronics, six disks $49; Business and finance five disks $42; Apple Tutor three disks $34. Send to: **H.M. Technology,** Dept. 1207, 1204 Ave. U, Brooklyn, NY 11229. 5-78

Apple Shareware- Let's trade. You send me your list, I'll send you mine. **Garry M. DeLong,** Po bOx 40853, Portland, OR 97240. 5-78

Apple Software used: Home Accountant $40; BankSTWriter $25; HomeWord + $35; Deadline $22; PlanetFall $22; Know your Apple IIe $15; Miner2049er $15; apple DKCard $25; Apple SSCard $90; also buy/trade used software: send list. **L. Moore/Apple Users Club,** 301 Nottingham Dr., Brick, NJ 08724.

Apple Software. Like new, used. All types. Discount Prices. Some demo software. Apple, IBM, Commodore. Will buy new, used software. Call or write for flyer. **J & J Electronics,** Box 6521, Reno, NV 89503. **702-825-8499.**

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CUSTOM APPLE PARTS

WE'VE OBTAINED a small supply of many of the custom ICs for the Apple II + and Apple IIe computers. These are real Apple parts, some new, some used, all tested and guaranteed. ROMs, keyboard encoders, P5A, P6A, video character generators, HAL/PAL, MMU etc. All priced below Apple wholesale. Enquiries from repair services who know what they want are welcome. We are NOT able to advise clone builders which parts are suitable for which clones. **Electrovalue Industrial,** Box 376-CP, Morris Plains, NJ 07950. 201-267-1117, M-F, 10-5. 1-83

Character Generator for your Apple IIe. Absolutely no hardware modification is necessary - simply pull out your old chip, and put the new one in. $20 gets you the chip and complete installation and operating instructions. Specify script or scientific set or send SASE for more info. **CPU International,** 11604 Starlight Ave., Whittier, CA 90604. 6-80

Computereyes $105, with camera $310; Modem with software $64.97; Summer Games II $26.75; COMPUSERVE $25.97; PRICES Include Shipping. To order send payment or call. VISA/Mastercard accepted. PA residents add 6% Sales Tax. **SENECA SOFTWARE,** 1104 Seneca Drive, R.D. #2, Harmony, PA 16037. **412-452-8418.**

Convert MacPaint graphics to Apple II quickly and easily. DOS3.3 disk includes Utility to convert Text files to Binary. Documentation, Source files, examples: $15. Everything provided except MacTerminal and AEPRO. **Lloyd Maxfield,** 2960 Ferry Street, Eugene, OR 97405. **503-344-3322.6-78**

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Free Information. Exciting new newsletter, recreational & educational computing newsletter, $18.95 per year. **REC,** 129 Carol, Clarks Summit, PA 18411. 5-79

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GENUINE APPLE IIe keyboards $45 and Genuine Apple Disk II drives, $175. **Computer Reset,** PO Box 461782, Garland, Texas 75046. 1-214-276-8072.

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Gamemaster Assistant disk set. Volumes 1 & 2 *(customizable). **Medieval Character Creation** has printer and screen options for unlimited characters and numerous types. **Determines** character race and sub-race, sex, age, abilities, and much more. **Calculates** customizable ability adjustments and percentages. **Adventure Assistant** handles up to a total of 144 characters, which can be split into as many as twelve groups with each group being handled totally individually. (terrain, climate, time of day, turn, combat, hit, points, etc.) Also has character addition/deletion, adventure savings and recall and much more available. Requires 48K and disk drive. Good for Apple II + and updates. Cost is $35/set. Limited quantities available. Send case, money-order or check to: **Mr. Ortner,** PO Box 2493, Virginia Beach, VA 23450.

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Help! Need info. Parts for Axlon ramDisk 320. Want SCRG QuikLoader. Have Apple I original manuals. You want? **Joe,** 51625 Chestnut Road, Granger, IN 46530. 4-77

How to repair the Apple computer by Dataline, original list $35; For Apple II/II + only, while supply last, $9 + $1.50 shipping. **Nexo Distribution,** 8824 Golf Drive, Spring Valley, CA 92077. 4-77

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5¼" DS/DD	.89	.85

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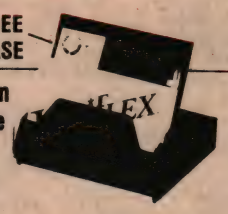
BOXED DISKS AS LOW AS 65¢

- Boxed in tens
- Write protect tabs and labels
- 100% certified

	50+	100+
3½" SS	1.47	1.39
5¼" SS/DD	.68	.65
5¼" DS/DD	.75	.69
5¼" HD	2.09	1.99

VERIFLEX

FREE CASE



- Packaged in tens in plastic library case
- 100% Certified
- Lifetime Warranty
- Tyvek envelopes

	50+	100+
5¼" SS/DD	.68¢	.65¢
5¼" DS/DD	.75¢	.69¢



- Lifetime Warranty ■ Thicker, 10 ml. jacket ■ 100% Certified ■ Tyvek sleeves, user labels and write protects
- Poly-bagged in fifties, sold in increments of 100

55¢ 400+ 5¼" SS/DD

61¢ 400+ 5¼" DS/DD

.56¢ 100+

.65¢ 100+

- Labels and write protects
- Poly-bagged in fifties, sold in increments of 250 ■ Envelopes

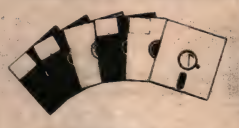
53¢ 500+ 5¼" SS/DD

59¢ 500+ 5¼" DS/DD

54¢ 250+

63¢ 250+

MULTI—COLOR 10-PACKS



each 10-pack has:

1 Dark Blue	1 Yellow
1 Light Blue	1 maroon
1 Green	1 Gray
1 Red	1 Brown
1 Orange	1 Magenta

- Poly-bagged in tens
- 10 colored disks ■ Tyvek envelopes
- Labels and write protects

	100+	400+
5¼" SS/DD	.79	.74
5¼" DS/DD	.85	.79

VERIFLEX BULK

- Tyvek envelopes
- Poly-bagged in fifties
- Labels and write protects
- 100% error free

	100+	200+	1000+
5¼" SS/DD	.49	.45	.44
5¼" DS/DD	.55	.53	.49

SONY MAC PAC

3½" SS DISKS



$1.45 each Qty. 400

$1.48 each Qty. 100

$1.53 each, Qty. 50

Sony Boxed in tens

	30+	50+	100+
3½" SS	1.65	1.62	1.59
3½" DS	2.65	2.57	2.55
5¼" SS/DD		.99	.95
5¼" DS/DD		1.19	1.15
5¼" HD		2.79	2.75

maxell

3½" SS DISKS

Packaged in fifties



$1.43 each Qty. 400

$1.45 each Qty. 100

$1.55 ea, Qty 50

Maxell diskettes, boxed in tens

	50+	100+
3½" SS	1.59	1.49
3½" DS	2.59	2.49
5¼" SS/DD	.99	.89
5¼" DS/DD	1.39	1.29
5¼" HD	2.79	2.69

XIDEX

	50+	100+
5¼" SS/DD	$ .60	$ .55
5¼" DS/DD	$ .65	$ .60

3M

5¼" DS/DD	$1.19	$1.15

MEMOREX

5¼" SS/DD	$ .89	$ .79
5¼" DS/DD	$1.15	$1.05

Verbatim

5¼" SS/DD	$ .89	$ .79
5¼" DS/DD	$1.19	$1.15

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POWER COMMANDER

Get upfront, individual switching for up to five devices.

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- Built in circuit breaker
- Total compatability



$102.99

POWER CONDITIONERS

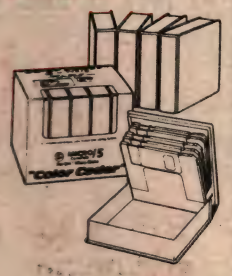
Provides clean power to guard against:

- Loss of irreplaceable data
- Erratic data displays and printouts
- Unwarranted shutdown of peripherals
- Irreparable circuitry damage

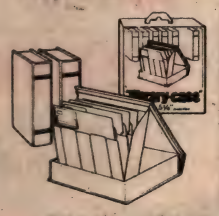
RV 250, rated 250 VA $142.99
RV 550, rated 550 VA $286.99

LIBRARY CASES

SRW



Each 3½" case holds five disks, includes spine and user labels
5 PAK (one each red, yellow, blue, green, grey)
$6.99 *(That's less than $1.40 each)*



Each 5¼" case holds ten disks and includes spine labels.
Many colors, each .. $2.99
5 PAK $12.99

RIBBONS

in sizes



NEW IBM PROPRINTER	$3.99 ea
Epson MX 70/80	2.45 ea
Epson MX 100	3.20 ea
Epson LX 80	3.20 ea
Epson LQ 1500	3.45 ea
C. Itoh Prowriter	3.09 ea
NEC Spinwriter	5.29 ea
Diablo Hytype II	3.19 ea
Okidata Micro 801/82A/83A/92/93	.99 ea
Okidata Micro 182/192	4.95 ea
Okidata Micro 84/94	2.20 ea

WE HAVE MANY OTHER RIBBONS IN STOCK!!

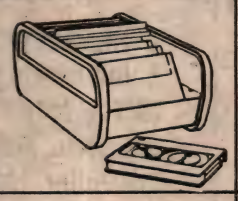
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Packed in fives

DC2000	17.19	DC100A	11.89
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DC600HC	23.69	DC300XLP	21.19
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SPECIAL!!

With every five cartridges you purchase, you can buy a rolltop that stores up to 7 data cartridges for $14.95! (Retails for over $22.99)
(holds carts. up to 6 1/3"×4 1/4"×3/4")



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Get real wood for the price of most plastic files!

Holds 50 3½" disks 19.99
Holds 50 5¼" disks 25.99
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THE ORIGINAL ROLLTOP**



Classic design holds 50 3½" disks or 120 5¼", with dividers and labels.

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5¼" model $24.99
**Buff and oak finish

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Wall, desk or flange mount.
$88.00 (Retails for $99.95)

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Fits large CRT's, eliminates eye strain and neck craning.
DURABLE
$24.99 (Retails for $29.95)

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Reinforced steel platform, tucks keyboard away when not in use.
$71.99 (Retails for $89.95)
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ANTI STATIC COVERS

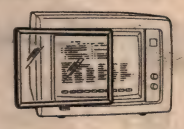
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Okidata Micro 83/84/93 ..... $12.99



CPU's

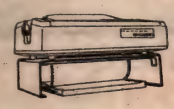
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SHORT CARD MODEM

- 100% Hayes compatible
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With Quick Link Telecommunications Software **$359.00**

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COLOR GRAPHICS SHORT CARD

■ Parallel printer port ■ Two year warranty ■ Made in the USA

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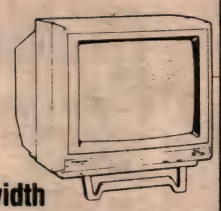
BOTH HAVE PARALLEL PORT

MONO GRAPHICS CARD

- IBM and HERCULES Compatible
- Parallel printer port
- Two year warranty
- Made in the USA

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- 12″ monochrome TTL
- 22 MHZ amplifier bandwidth
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- 350 lines vertical resolution
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AMBER OR GREEN **$99.00**

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20 MEG HARD DRIVE

1. Highest quality available
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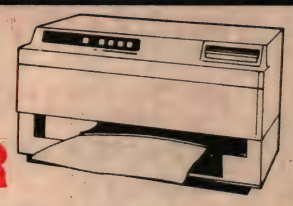
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Font cartridges From 7.5 to 16 point	$209.49 ea
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FULLY HAYES COMPATIBLE **$195.00**

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- Amber or Green Magnavox TTL monitor-two year warranty
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- Uses MS DOS operating system
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Version 1A

$239.00 *Ask about free upgrade!*

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WORDSTAR
Version 3.3

$129.00

BPS Graphics
$79.00

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Add a MULTI I/O card for these features:
■ Clock/Calendar ■ Game Port ■ Serial and parallel ports ■ Disk controller
$149.00 (With system, $139.00)

Add a "smalltalk" internal half card modem for:
■ 1200/300 baud modem capabilities
■ 100% Hayes compatibility
■ Five year warranty
■ Single keystroke commands and an 18 number dialing table
■ Single keystroke access to DOW JONES NEWS RETREIVAL and the SOURCE
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Add a 384K Multifunction card for:
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Protect your system with a PERMA POWER surge protector:
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6-78

Kameleon Parallel printer interface for IIc, Graphics Dump Software, like new $35. **Len, 212-777-4353.**

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SSDD, Half Ht., 9 Mo. Guar.

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90 days warranty. Add $3 shipping (disk drive $5 shipping). VISA/MC add 4%. **Kyntek Marketing,** PO Box 13070, Minneapolis, MN 55414. **612-379-1020.** **6-79**

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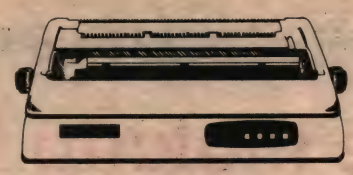
Printer Liquidation



Canon Color Ink Jet Printer $199

Canon PJ-1080A Ink Jet Printer - 37 cps, 640 dots per line, 7 striking colors, centronics parallel interface. Can be used for overhead projections. Works with all standard IBM graphics packages. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

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NEC Dot Matrix Printer $139

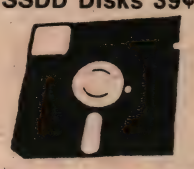
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SSDD Disks 39¢



48 tpi, 5¼" With Envelopes

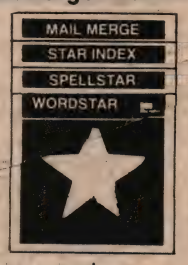
Xidex, 3M, Nashua, Data Encore, Wabash

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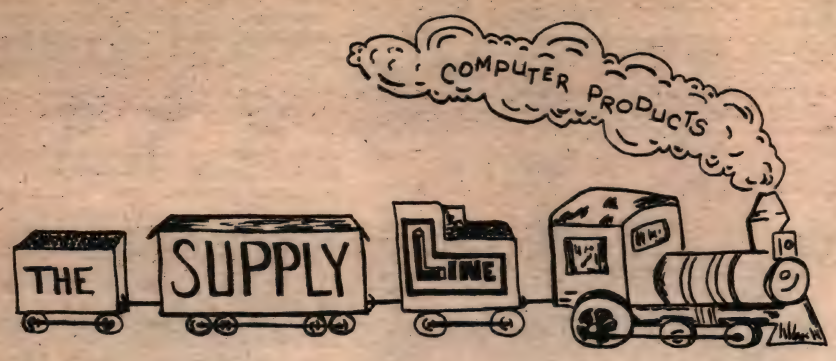
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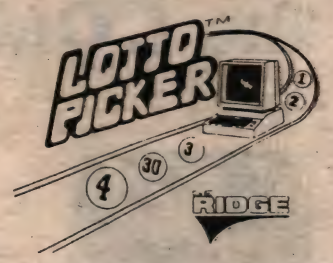
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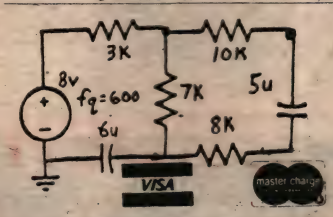
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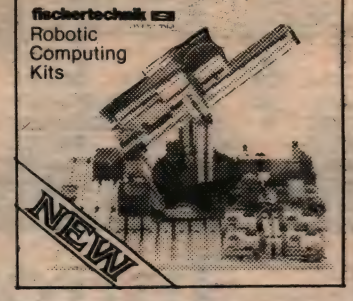
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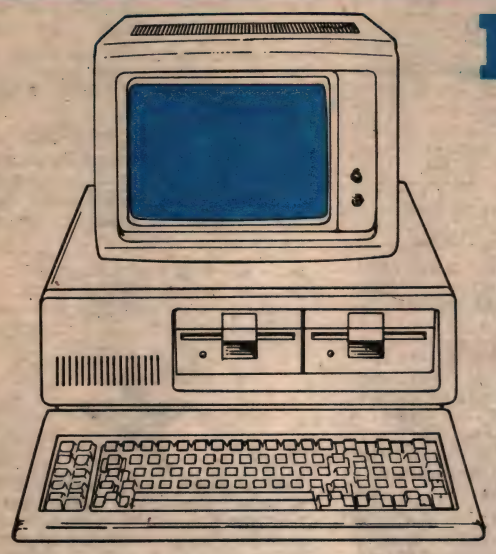
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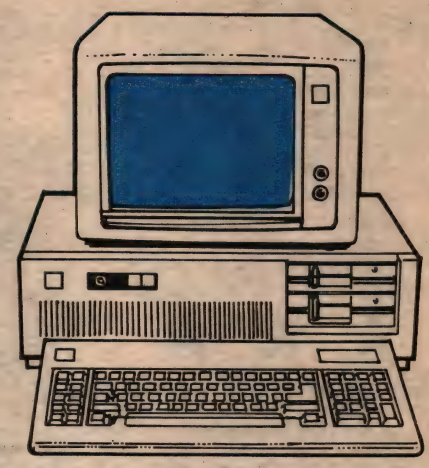
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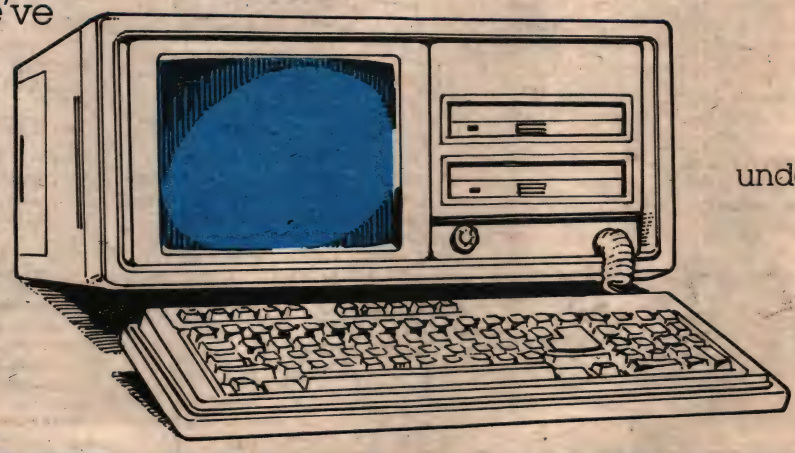
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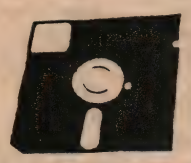
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"IBM PC, 256k dual floppy, parallel printer, async and color cards, Amdek 710 RGB monitor, PC-DOS 3.2, tutorial, books; like new $1700 you pay freight and insurance. **313-383-6537, evenings."**

IBM PC-COMPATIBLE 128K (-640K) 2DD, Monochrome, 30-day warranty, Mint, $590. **919-758-5163.**

★ ★ ★

IBM STUFF!!

We buy, sell & horsetrade for IBM & clones. Trade your Apple or Commodore in on an IBM Clone & pay less! **Shreve Systems,** 845 Lark Avenue, Shreveport, LA 71105. 318-865-6743 4-9 pm CST. 3-79

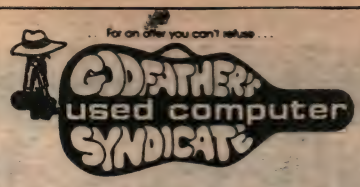


IBM AT COMPATIBLE

640K (1MB Capacity), Floppy/Hard Controller, 1.2MB Drive, Monochrome Graphics Card, TTL Monitor, Serial/Parallel.

$1699, w/20MB. $1999

THE BROKERAGE 619-728-9609



$$$$ Make Sure you see our full page ad in this issue. You can save megabucks in our IBM for our Columbia's and our AT!! We are trying to find a piece of software that won't run on it but haven't had any luck yet. Please help. Look us up in the index on next to last page. Like New, with 90 day warranty for $999 delivered -- Portables also available -- First come first served. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

PC Compatible, 256k B RAM, 2 Floppies, 1 parallel port, tilt swivel green monitor, MS DOS 30 day warranty $1100. Guaranteed compatible. Add $300 for Okidata ML83A Printer. **Paragon Computer Corporation, 203-525-0389.** 5-78

PC Junior (enhanced, 128k) with Jr. Color display RGB Monitor, DOS 2.1, Cartridge BASIC (cost $1,099), keyboard cord (cost $20), Parallel Printer Attachment (cost $99), Serial Device Cable (cost $25), 300-baud Anchor Volksmodem (cost $65), "King's Quest" adventure game (cost $45), two books (cost $35); all for only $750 (includes shipping). Also Panasonic printer for sale to complete system. **Gary Smith, 615-885-3831,** after 6, no collect calls.

PC-XT, Compatible, 256K B RAM, 1 Floppy, 20 mB hard disk, 1 parallel port, tilt swivel green monitor, enhanced keyboard, MS DOS, 20 day warranty. $1900. Guaranteed compatible. Add $300 for Okidata MS83A Printer. **Paragon Computer Corporation, 203-525-0389.** 6-78.

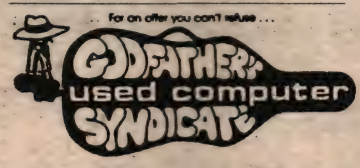
PC-XT, Pure IBM, 256k B RAM, 1 Floppy, 10 mB hard Disk, 1 parallel port, Green Monitor, DOS, 30 day warranty $2100. Add $300 for Okidata ML83A printer. **Paragon Computer 203-525-0389.** 5-78

(115A) IBM PERSONAL COMPUTERS WANTED

★ ★ ★

Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79



$$$$ I BUY, Sell, & Trade IBM PC's. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

MAILING LIST

Customer list of over 300 IBM-PC users who have requested information on custom software for the IBM-PC. Ideal for product announcements for software developers. Includes names, titles, addresses of managers, engineers, users in many major US and Overseas corporations. Names wnere generated from ads in DESIGN NEWS, CHEMICAL ENGINEERING, POWER ENGINEERING, at a total cost of over $2000. Mailing made in early 86 with no bad address returns. PRICES: Listing—$25, Listing + Disk—$30. With DBASE3 Mailing List Program to Generate Labels & Index Cards $79, Program only $49. CONTACT: **ECP,** 7 Wintonbury Rd., Simsbury, CT 06070. 5-78

WANTED IBM PC-Jr. computers, peripherals and accessories. We buy close outs. Call or write with price and description. **Computer Reset,** PO Box 461782, Garland, TX 75046. 214-276-8072.

★ ★ ★

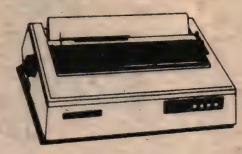
Wanted To Buy: IBM PC, XT, AT. We will give you a fair price for your equipment. Call **PC Rent, 919-884-4067.** 5-79

(115B) IBM SOFTWARE PERIPHERAL

1000's of FREE IBM SOFTWARE programs available from **PUBLIC DOMAIN USERS GROUP.** Over 8500 members worldwide. Over 80 computer formats. For information send large SASE to **Public Domain Users Group,** Box 1442-C1, Orangepark, FL 32067. 5-78

1. DOSMASTER: Don't work for DOS! Put MS-DOS or PC-DOS versions 2.0 and higher to work for you. Double-sided floppy contains a non-technical reference/tutorial for every DOS command with batch file access; DOS utilities; techniques; and programs. Tame DOS at the introductory price of 17.50. **2. DOS DATABASE:** Sort/view/print files in DOS 2.11 and higher. Use ready made dbases or learn how to write your own. Easier and faster than commercial applications. Two best shareware DBASES free with DOS DATABASE, $19.50 (3 disks). **3. COLORTIME:** How to/reference on COLOR in BASIC and DOS. COLOR.BAS displays every possible color combo in BASIC. COLOR.BAT offers menu-driven DOS color selection. Best shareware COLOR UTILITIES/DEMOS free with COLORTIME, $32.50 (5 disks). Send check or money order to **SHEPARDSON'S,** 4024 Beardsley DR., Montgomery, AL 36109. Free shipping, not copy protected. **ORDER ANY TWO ABOVE AND RECEIVE BEST DOS UTILITIES FREE.** 6-79

20 CPS Daisywheel Letter Quality Printer With Automatic Cut Sheetfeeder



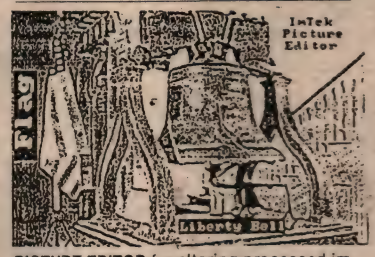
$369

Axiom DX 2000 13" letter quality printer with 75 sheet automatic sheetfeeder. Also available, Axiom DX 2500 15" 25 CPS printer with sheetfeeder $419. For more information on these and other super bargains, see ad index for **BCE** full page display ads in red. **BCE 1-800-545-7447.**



!!! GRAND DUCHY !!!

A fantasy game of medieval conquest pitting you against up to 23 other kingdoms run by your friends or the computer. Do you have what it takes to become Emperor? You will demand tribute, fight wars, aid allies, carve out a realm and sack the barbarian hordes. The game program is upgraded every few months and is NOT copy protected. PC or clone with 256K, color, and DOS 2.0+ required. Full version with up to 24 players is $25.00. Limited version with 1 player vs. computer for $10.00. Latest upgrade to registered owners is $10.00. Send check or MO to **Galactic Enterprises,** PO Box 24297, Dayton, Ohio 45424.



PICTURE EDITOR for altering processed images or creating new images. Add alphanumerics, geometric shapes, fill etc., $13.95. **Image Processing Package** for image enhancement, computer art, graphics etc. Includes test images, $39.95. Printer and picture database demo package for MX-80 and color display $6.95. Minimum system: 256K, color card and 1 disk drive. **Pictures digitized** from photos at $.50 each plus $3.00 per disk. Additional $.50 processing charge per photo to view image using color display. **Video/Audio digitizer** available soon. Call or send for details. 419-382-0079. **ImTek,** 1460 Eastgate Rd., Toledo, OH 43614.

★ ★ ★

ACCOUNTS RECEIVABLE

TURBO FAST, balance forward ACCOUNTS RECEIVABLE system. handles charges, payments, and adjustments. Keyed data may be reviewed and modified before posting. Allows for four aging periods. Late charges automatically applied. Prints customer list (alphabetic or account number order), customer ledger (all customers or customers that owe in specified periods), mailing labels, statements (all customers or selected customers), proof sheets (reduces data entry errors), and posting reports (for easy audits). Requires 256k IBM PC or compatible, DOS 2.1+, 80 column printer, and DS/DD disk drive or hard disk drive. Complete system only $49.95. **Customized Software, Inc.,** POB 6992, Tyler, TX 75711.5-78

ASCII PRINTER - RAM Resident program to replace the Print Screen Key on the IBM and compatibles. Allows the operator to define the area to be printed with two key strokes. $20 + $2 S&H. **J & M Software,** 400 Sawyer Road, Lansing, MI 48910. **517-393-8660.**

Advanced Digital PC/SLAVE 256k memory, 8088 CPU, adds additional terminal to PC/XT. Like New, $395. **Len, 212-777-4353.**

Attention IBM WordStar Users Up To 60% Off



For IBM PC and Compatibles

CorrectStar (Updated SpellStar) - Corrects spelling from 65,000 word dictionary; offers alternative spellings. Just type a word the way it sounds and CorrectStar will find the correct spelling. List Price $145..ONLY $49; MailMerge - Merges files and for personalized form letters; assembles mailing lists and labels. List Price $99..ONLY $49; StarIndex - Creates alphabetized indices and tables of contents. List Price $99..ONLY $49; All 3 - CorrectStar, MailMerge, StarIndex..ONLY $99. For more details on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

Avery List & Mail Software package for mailing list management, never used, $50. **Len, 212-777-4353.**

★

BARCODE PRINTING SYSTEM

Print 3of9, 2of5, 2of51, 2of5M, codabar, and UPC-A labels on your IBM PC with Epson, IBM, or C.Itoh dot matrix printers. Input from screen or file, auto increment, and online help. ALL for one low price, ONLY $71.95. Send check, MO, PO#, or Mastercard. **The Komputer Kitchen,** POB 267, New Haven, CT 06502 or call **203-389-6177.**

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6-78

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BUSINESS INVENTORY/INVOICING System Software. No frills, totally tutorial, Menu driven programs. For person interested in RESULTS rather than fancy screens and pretty graphics. Partial list of features include English language Customizing, full use of numeric keypad, directly loadable compiled programs, immediate display of any item, search by description, Lot or Batch number capability, re-order point and stock objective. Invoicing uses 1 part stock form with option for pre-printed logo, inventory and non-inventory items, taxable/non-taxable, flexible discount options, sur and shipping charges. Prints picking ticket, mailing labels, Back Order tickler. Reports include Stock Status, Valuation, On-order Status, Stock Location, Sales History, Catalog, Profit Margin. 2,000 items per floppy disk with multiple disk capability. Up to 30,000 items on 10 meg hard disk. Designed and programmed by DP professional with 32 years experience. To get additional information write or call. Evaluation diskette and instructions $10.00. Floppy Disk system with manual $395. Hard disk system (availble May 15) $495. CCR No credit cards. Phone **404-361-5958.** 6-79

★ ★ ★

BaseBall/SoftBall Statistics; Compute, store, update softball/baseball team, opponent, roster info, game info, and schedule information. MS-DOS operating system, 1 drive, 256k or harddisk required. Specify either BaseBall or SoftBall version. send $24.95

WHY PAY MORE?

IBM Compatible Software
only $5 per disk
OVER 500 DISKS FULL
OF PUBLIC DOMAIN AND
USER SUPPORTED PROGRAMS

LONE STAR Software

Summary of Disks

People often ask "... how can you sell any really good programs for $5? After all, everyone knows you have to spend $300 on a good word processor, database manager, or spread sheet program . . . don't you?"

The truth is many of our satisfied customers have discovered that our public domain and user supported programs are actually some of the best and most sophisticted software you can buy, at any price! The commercial retailers don't want you to know about us or our programs, but why pay hundreds of dollars more for software that won't do anymore than our $5.00 package. Here is a sample of our library by category.

WORD PROCESSORS

PC-Write 2.5 (#78) A full featured word processor that is faster than Wordstar.
TSCRIPT (#422) word processor for PC-JR only. Pascal source code included.
DICTIONARY (#378) Dictionary type spelling checker.
IV-ED (#415) Word processor - editor.
LETTERWRITER (#415) controls letter processing.

SCREEN EDITORS

FRED (#83) Screen editor similar to IBM's Personal Editor.
RV-EDIT (#190) Full screen editor from Bob Vollmer.
FOIL EDIT (#347) Full screen editor. Top to bottom and left to right.

TEXT PROCESSING TOOLS

PC-READ (#194) Program to determine clarity of text.
FOGFIND (#378) reverses writing complexity using the "Fog Index".
ROFFA 1.61 (#416) make beautiful text formats with this processing tool.
QPARSER (#419) Public Domain version of this famous system.
WORDSTAR AIDS (#379) collection of the most useful utilities for the Wordstar user.

DATABASE PROGRAMS

PC FILE III (#5) most popular database program from Jim Button.
U-MIND (#133) Fast hashing makes this a dandy database. (Intelligent database)
DATABASE OF STEEL 3.1 (#214, 215, 267, 268) Database spreadsheet and expert system from Potomic Engineering.
NEWBASE (#233) Menu driven database for the beginner.
PC-DBMS (#383) A relational database management system that provides on-line help and screen editing functions.
ELSIE EXPERT SYSTEM (#398) Artificial intelligence shell to build a custom knowledge-base.
PDS*BASE (#396) Complete hierarchical data base system master/detail or mother/daughter type.
CREATOR (#339) create, report, and sort makes this a super database management system.
INFOBASE (#340) Forms driven database management system similar to INFOSTAR.

DATABASES

BOBCAT (#247) Small business database. Excellent!
MFIND (#311) Database of over 2000 movies that can be searched in any category, or you can add your own.

SPREADSHEETS

PC-CALC (#199) Fabulous 123 work-a-like from the author of PC-File.
PC-PAD (#406) Spreadsheet and address book program written in basic.

SPREADSHEET TEMPLATES

LOTUS 1-2-3 TEMPLATES AND MACROS (#140, 141, 165, 257, 289, 301-304, 406, 414) Why spend hours of writing your macros when these are ready made? Modify them yourself.
SYMPHONY WORKSHEETS (#305, 306)

FINANCIAL PROGRAMS

PC-CHECK MANAGER (#275) Keeps multiple checkbooks in balance.
TAX FILE DBS (#295) Tax record keeping system that saves you money on April 15.
SAGE TRADER (#242) Analyzes commodoity trades. Don't "short" this one!
PORTSWORTH PACKAGE (#101) Evaluates your ever changing stock portfolios.
FINANCE (#164, 227) Determine present and compound values, interest rates, etc.
HOME FINANCE (#406) Lotus 1-2-3 Macros for real life applications.
PC-GENERAL LEDGER 1.2 (#237) An exceptional accounting system. Used by some CPA's.
TIME AND MONEY (#251) Financial record keeping and analist system.
LOAN AMORTIZATION (#399) For output to screen or pinter. Lots of on-line help.

COMMUNICATIONS

QMODEM (#310) The best and fastest communications programs you can buy at any price, bar none!
PC-TALK (#391) The classic "Freeware" communication program.
PC-VT (#286) VT-100 Emulation.
SYSCOMM (#338) Menu driven system allowing unattended file transfer.
RBBS 12.2 (#212) Become a SYSOP and start a bulletin board.
FIDO NET (#333) Bulletin Board System. Perhaps the easiest to run.

MATH AND STATISTICS

EPISTAT 3.1 (#88) Statistical analysis of small to medium-signed data samples.
KLP 1.9 (#332) Kinetics linear programming system.
MATH PAK (#394) Programs to teach and accelerate some math functions. BASICA

LANGUAGES

CHASM 2.13 (#10) Cheap assembler with tutorial.
LADYBUG 1.0 (#94) Logo like program.
XLISP 1.4 (#148) Lisp language interpreter.
LAXON & PERRY FORTH (#263, 264)
MVP-FORTH (#31, 32) Two disk set of Mountain Valley Press Forth.
3 FORTHS (#352) To modify or expand your own forth language. MVPFORTH, FORTH-H and SEATTLE Computer's Forth.
PROLOG & UNIFORTH (#417) Complete with editor and documentation.
SNOCREST BASIC (#409, 410) two disk set. Real basic interpreter with manual. Can be used with a multi-user system.
TBASIC (#381) Tiny basic. A limited subset of BASIC. Could be placed on a chip.

PASCAL SETS

PASCAL TOOLS (#130, 133) Volume 1, 2 and 3 with source code from the famous book.
TURBO PASCAL-TOOLS (#248, 279, 292, 298, 324, 351, 353, 364, 365, 366, 375, 392) 12 volumes of tools and utilities written especially for turbo Pascal. The most extensive collection around!

UTILITIES

DISKCAT 4.0 (#106) Catalog all your disk files in a hurry.
GINACO (#66) 54 polished routines written in basic for any beginner or experts. We love it!
ULTRA-UTILITIES 4.0 (#133, 245) Recover lost files, modify sectors, etc. Like Nortons.
SYSMENU (#250) Build a menu driven menu system. Excellent for hard disks.
LOAD-US (#284) Allows Lotus and Symphony to be used on a hard disk.
ALIGN 1.6 (#217) Disk alignment tool.
TOP UTILITIES (#273) All of the most requested utilities on one disk.
NUMZAP (#284) Removes line numbers from BASIC programs.
BASIC XREF (#358) Chose bags with this BASIC cross-22 refernece utility.
PC-INPUT (#363) Program for BASIC screen generation.
PATCHES (#376) make back up copies of some of the most popular commercial programs with this collection.

PRINTER UTILITIES

SP 3.4 (#186, 275) Printer buffer that partitions your data so you can use your computer and print at the same time.
SIDEWAYS (#265, 411) Prints text sideways on an Epson printer.
SETPRTR (#79) Sets up Epson printer from a menu.
SLIDE (#244) produce medium resolution slides and overhead transparencies.
PRINTER UTILITIES (#411) Sorgasboard of utilities and tools.
EPSON PRINTER UTILITIES (#326) Spool, set up routines all designed for Epson codes.
BANNER (#386) make long banners with large letters. Includes MS-FORTRAN source codes.

EDUCATION

PC-TOUCH (#249) A typing tutor.
EQUATOR (#249) A teaching tool for math, science and finance.
PC-TUTORIAL (#403) A first course in computer usage covering various aspects of MS-DOS. Good!
PC-PROFESSOR (#105) Learn Basic the easy way. One of the best tutorials on BASIC.
PC-DOS HELP (#254) type "help" for the DOS command you forgot.
FLASH CARDS (#367-370) 4-disk set. Vocabulary builder, spelling teacher.

GAMES

TOP GAMES (#274) The most requested arcade type games.
ARCADE GAMES (#293) Another goodie bag of top Arcade games.
EMON (#296, 297) Adventure game compiler.
TRIVIA GAMES (#327-329) Lots of files and documentation for hours of fun. Will not work on PC JR.
PC JR GAMES (#354) Games that will work only on PC JR. Combat, dungeons and dragons, Global Thermonuclear War.
MISC. GAMES (#390) Good selection of educational, adventure, and arcade games.

MUSIC

PC-MUSICIAN (#127) Compose music on your PC, save and play again.
PIANO MAN (#279) Play your PC keyboard like a piano.

APPLICATIONS

GENEALOGY ON DISPLAY 3.0 (#90)
GENEALOGY - FT 1.25 (#240) from Pine Cone software.
LABELMAKER (#146) Our favorite label file and maker Menu driven.
PC-FLY "Fliteplan" 2.1 (#261) Pilots prepare and file your flight plans.
RECIPE 83 (#281) Recipe index for use with PC File III (#5)
FAMILY HISTORY (#361) Family history, ancestor and decendant charts. Sample programs.
FORM LETTERS (#388) LOTS of samples of the most commonly used business letters. Modify!

GRAPHICS

PC-KEY DRAW (#344-345) A small CAD system. Lots of demonstration files.
PC-PICTURE GRAPHICS (#136) Drawing package allows you to zoom, color, and store pictures.
PC-GRAPH (#418) Allows user to create graphics from PC-File report files.

ORDER FORM

LONE STAR SOFTWARE, INC.
2100 Hwy. 360, Suite 1204
Grand Prairie, Texas 75050
214/647-1010

SHIP TO: _____

TOTAL #_____ x $5 = _____
DISK DIRECTORY (Explanation of all files & programs) x $5 = _____
OTHER _____ = _____
SUBTOTAL _____
TEXAS RESIDENTS ADD 6⅛% TAX = _____
SHIPPING & HANDLING = _____
(1 @ $1.00 and .50 for each additional disk)
TOTAL _____

☐ MASTERCARD ☐ VISA
CARD NO. _____
EXPIRATION DATE _____
SIGNATURE _____

PLEASE ENCLOSE CHECK WITH ORDER

CIRCLE DISK NUMBER DESIRED:

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MICRO WAREHOUSE

We bring the warehouse to you!

One stop shopping...



IF YOU DON'T SEE WHAT YOU WANT, CALL!! ONE STOP SHOPPING

PRINTERS

STAR MICRONICS

SD-10	160 CPS	$290.00
SD-15	160 CPS	$380.00
SR-15	200 CPS	$585.00

EPSON

FX-85	BEST
FX-286	PRICES
RX-100	PLEASE
LQ-1500	CALL

OLYMPIA

NP DOT MATRIX 165 CPS	$275.00
RO LETTER QUAL	$295.00
COMPACT 2 TYPE/PRINTER	$345.00

MICRO WILLIE SAYS

"IF YOU DON'T SEE IT, ASK FOR IT!..."

IBM COMPATIBLE COMPUTER



MW-XT DUAL DRIVE SYSTEM
640K, SERIAL/PARALLEL, CLOCK/CALENDAR W/BATTERY, MONOCHROME MONITOR, GAME PORT, MONOCHROME ADAPTER $ 895.00

MW-XT HARD DISK SYSTEM
SAME AS ABOVE PLUS 20MB HARD DISK W/CONTROLLER $1350.00

ALL SYSTEMS COMPLETE AND TESTED 1 YEAR WARRANTY. WE CAN CONFIGURE OUR MW-XT TO YOUR CUSTOM SPECIFICATIONS

COMPUTER POWER ACCESSORIES

TRIPP LITE

LINE FILTER, SURGE/SPIKE SUPPRESSORS

Model No.	Outlets	Cord	Features	Dealer Price
IBAR 2-6	2	6'	1 Isobar filter	$ 39.00
IBAR 4-6	4	6'	2 Individual Isobar filters	$ 49.00
IBAR 8-15	8	12'	4 Individual Isobar filters	$ 59.00

BROWN-OUT PROTECTORS/ LINE CONDITIONERS

LC-1200	4	10 amps Isobar Protection	$149.00
LC-1800	6	15 amps Isobar Protection Line Monitor Lights	$199.00

EMERGENCY POWER SYSTEMS

BC-200-10	200	10 ampere hr battery 12vDC to 117vAC	$235.00
BC-200-28	200	28 ampere hr battery 12vDC to 117vAC	$285.00
BC-425-FC	425	FC and Audible Alarm 12vDC to 117vAC	$395.00
BV-1000-FC	1000	FC and Audible Alarm 12vDC to 117vAC	$854.00

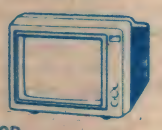
OTHER

POWER SUPPLY IBM PC/XT $95.00
ECONOMY POWER STRIP 6-OUTLET $28.00



MONITORS

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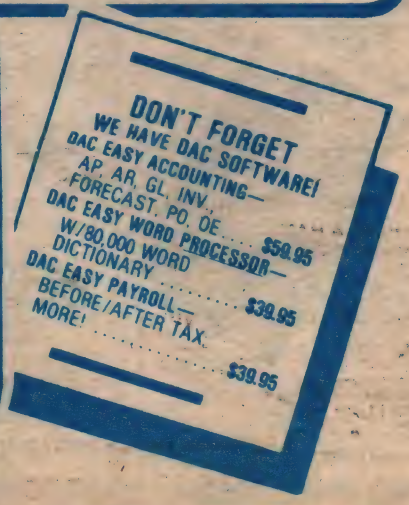


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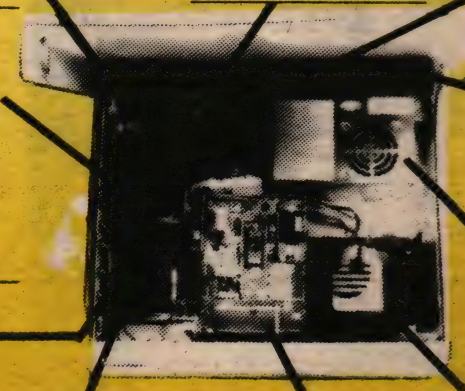
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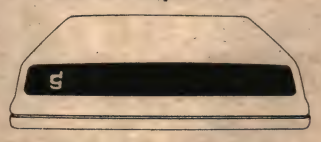
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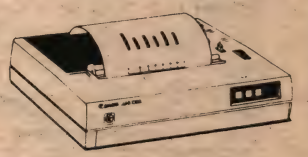
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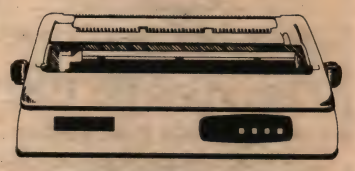
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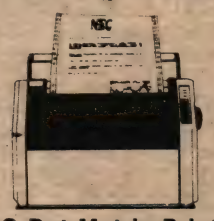
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Quick/Easy/Best value ● Thousands of items ● For sale by owners ● National Listing Service ● No Commission ● Only $29.95 to list until sold!

1-800-TECTRAN

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VISA/MC Accepted ● 401-467-8888
6-79

My buddy and I have three PC-8001A systems including 8031A/8012A/8041A, three comm. boards, one memory board, spare cables, desk and lots of good software + parts for a fourth system. Call **Ray or Dave** at **(818)762-5520,** Box 8862, Universal City, CA 91608. 5-77

NEC APC H0-3. Graphics board, 640K RAM, CPM-86, MS-DOS, Much software. **Pete 612-778-0923.**

★ ★ ★

NEC-APC two DSDD-8" drives. Monochrome monitor, clock/calendar, serial, parallel ports. CP/M-86, dBase-II, Crosstalk, Supercalc2, Wordstar, Mailmerge, Spellstar, others. $800. **Don Foree,** Box 92, Chapel Hill, NC 27514. **919-967-2764. 6-78**

(116A) NEC COMPUTERS WANTED

I want twenty used NEC PC-8201A's. send quote for full or partial lot. **Dennis Meadows, 603-675-2230,** Box 58, Plainfield, NH 03781.

NEC-APC, NEC-3530 SpinWriter, NEC-P5, Epson LQ1500 wanted in running condition. **201-757-2839,** Box 187, Newark, NJ 07060. 3-77

NEC-APC, NEC-3530 SpinWriter; NEC-P5, Epson LQ 1500 wanted in running condition. **201-757-2839,** Box 187, Newark, NJ 07102. 6-88

(116B) NEC SOFTWARE, PERIPHERAL

★ ★ ★

NEC 8201/8401 MEMORY EXPANSION

NEC 8401A 8K Module..Qty 3 = $19 ea.
32K RAM Cartridge.....$89 ea

8401 (STARLET) RAM Cartridges

128K DATAPAC = $169
256K DATAPAC = $329
3-½" DISK DRIVE (300K CAPACITY) = $295
NODE COMPUTER SYSTEMS
916-265-4668, 408 Broad St., Nevada City, CA 95959.

NEC Model 230 Mini System: Includes spinwriter and two operator stations. 192K in main memory, 40MB fixed disk, and 1.2 MB floppy drive. Includes all operating system software. Business application programs including A/R, A/P, G/L, Sales Order Processing, Payroll, and Sales Analysis Reporting. **All-Tronics Medical Systems,** 14311 Madison Ave., Lakewood, OH 44107. **216-221-6742.**

NEC PC-8201. - Send for free catalog of compact affordable software. **CSA Software,** PO Box 22261, Chattanooga, TN 37422. 6-84

PUBLIC DOMAIN PC-8000 software. 95 CP/M and NBasic disks, $4 each. Send SASE for catalog. **Long Island NEC Users Group,** 75 Weaving Lane, Wantagh, NY 11793. 2-78

(117) OHIO SCIENTIFIC

(117A) OHIO SCIENTIFIC COMPUTERS WANTED

(117B) OHIO SCIENTIFIC SOFTWARE, PERIPHERAL

(118) OSBORNE COMPUTERS FOR SALE

...for an offer you can't refuse...
Godfather's used computer SYNDICATE

$$$$ I Have Osborne computers for sale with 90 day warranty. Used-$500, Like New-$600, We also do upgrades. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

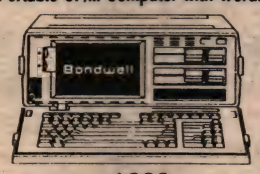
Osborne Computers, Parts, & Upgrades. Complete Executives & 0-1's $595; handle fans $25; Factory double density boards $50; Add $5 S/H, $20 for computers. Call or write for complete listing. **Nuevo Electronics Corporation,** POB 209, Richmond, TX 77469. **713-341-6001.**

NEW Osborne MS-DOS SYSTEMS! Model 2100w/ Monochrome monitor, 2 floppy drives, MS-DOS 2.11, parallel card V20 (CP/M Software!) $1995. **Model 2110 w/Monochrome** monitor, 1 floppy drive, MS-DOS 2.11, Parallel Card, 10-Meg HD, V20 (Runs CP/M software!) $2495. **Model AT w/Mono Monitor,** 1- 1.2 meg floppy, Parallel Card, 512K, $2995. **Model AT-20 w/Mono Monitor,** 1- 1.2 meg floppy, Parallel Card, 512K, 20-meg HD $3995. Semi-kits Available- Trade-ins Accepted! Authorized Osborne Dealer! Visa/MC. **B Systems,** 3228 S. Boulevard, Suite 577, Edmond, OK 73013. **405-341-7437.**

OSBORNE: Buy-Sell-Trade Computers, parts, accessories, and software. **TTM Inc.,** PO Box 8256, Brownsville, TX 78521. 512-831-9341. 4-77

One Osborne computer, CPM2.2 Wordstar, SuperCalc III, owner's manual, optional fan installed. $375. **Call 615-821-4248.**

Portable CP/M Computer with Wordstar



$399

Reads Kaypro and Osborne Software

The Bondwell Model 12 CP/M computer - 64k RAM, Dual 180k SSDD Disk Drives, $399; Also available, Model 12A - 64K RAM, dual DSDD 360K Disk Drives, $449; Model 14 - 128K RAM, Dual DSDD 360K Disk Drives, $499. Complete WordStar, MailMerge, ReportStar, CalcStar, DataStar package included free! For more information on this and other super bargains, see ad index for full page **BCE** display ads in re1. **BCE 1-800-545-7447.**

(118A) OSBORNE COMPUTERS WANTED

...for an offer you can't refuse...
Godfather's used computer SYNDICATE

$$$$ I Buy, Sell, & Trade Osbone computers working or not. We also do upgrades. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

Paying $5.00 per pound for scrap tantalum capacitors. Any amount, fast payment! Ship: **Sciuto,** 103 Saratoga St., Lawrence, Mass. 01842. 9-79

(118B) OSBORNE SOFTWARE, PERIPHERAL

100's of FREE OSBORNE software programs available from **PUBLIC DOMAIN USERS GROUP.** For information send large SASE to **Public Domain Users Group,** Box 1442-C8, Orangepark, FL 32067. 5-78

Osborne Vixen Computer, with all bundled software and new warranty $995. **Ron Strine,** 108 N. Hanover St., Carlisle, PA 17013. **717-243-4424.**

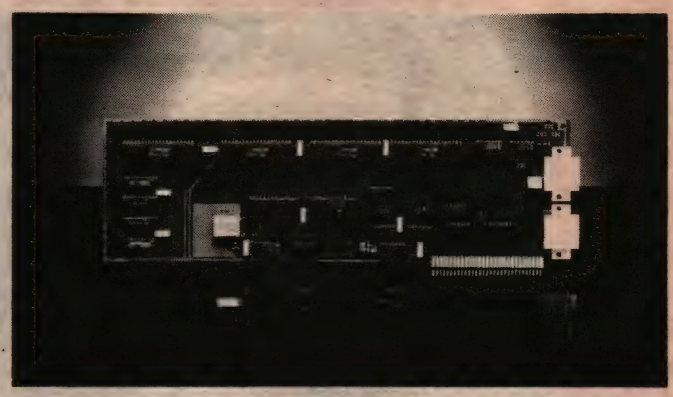
(120) MS/DOS COMPUTERS FOR SALE

★

AT & T PC6300 - Unused still in shipping box. AT & T employee won this computer

HOW TO PUT YOUR IBM-PC TO WORK IN THE "REAL-WORLD"

(First, Buy This Board!)



96 TTL I/O PORTS FOR THE IBM-PC

The Model 1018 Multi-I/O Board for the IBM-PC: ICD has packaged **96** Input-Output Channels onto a single full-length board for the IBM-PC, XT, and buss-compatibles. This high-density TTL-level I/O board can be used to monitor switches and sensors, control relays, motors, even drive low-current LEDs directly! Simply instruct the on-board PIO (parallel input-output) circuitry to sense or output +5 Volt signals in groups of 8 (making 12 groups possible). An additional 48 TTL Inputs and 2 RS-232C Serial Ports provide unprecedented capability on a single board! Optional 64-pin header connectors with attached ribbon cables will plug directly onto the board, available in 4, 10, and 20-foot lengths. Ideal for many OEM, VAR, and computer enthusiast uses in process monitoring and control, energy management, security, home control, and other "Real-World" applications! Includes sample application software listings for the PC, pinout diagrams, and handy "channel assignment" sheets.

- 12 Eight-Bit Parallel TTL-Level I/O Ports Utilizing 8255 PIO Devices
- 4 Eight-Bit Parallel TTL-Level Input-Only Ports
- 2 RS-232C Serial I/O Ports with Jumper-Selectable Baud Rates (110 Baud to 19.2K Baud)
- Crystal-Controlled Communications Timing
- High-Current Serial Output Option
- Hardware-Selectable Base Address (allows multiple board use)
- Occupies One Full-Length IBM-PC Expansion Slot

1018 PC-I/O BOARD $495.00. Now available through ICD Products Dealers and Representatives Worldwide.

More ICD "Real-World" Computer Interfacing Products:

RTS-1	Remote Temperature Sensor
RLS-1	Remote Light Sensor
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HVAC-1	Remote HVAC Controller Module
ADV Series	Remote-Controlled Air Duct Valves
S-100	Analog I/O and Calendar/Clock Boards

FOR MORE INFORMATION: SIMPLY MAIL THIS AD WITH YOUR BUSINESS CARD OR PRINTED NAME & ADDRESS TO ICD AT THE ADDRESS GIVEN BELOW, OR CALL (818) 889-3179, M-F, 8AM TO 5PM, PST.

SPECIAL OFFER! PURCHASE ICD'S POPULAR BOOK, "HOW-TO" APPLICATION NOTES, AT 25% OFF THE COVER PRICE — SIMPLY ENCLOSE THIS AD & CHECK OR MONEY ORDER FOR $18.75 + $2.00 S&H (ALASKA & HAWAII $3.50 S&H). ALLOW 2-4 WEEKS FOR DELIVERY.

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* KEYBOARD SELECTABLE DUAL SPEED (4.77MHz-8.0MHz)
* 68% FASTER THAN IBM PC/XT.
* FULLY IBM PC/XT COMPATIBLE.
* COMPATIBLE WITH NEC V-20 MICRO PROCESSOR.
* 640K MEMORY ON BOARD.
* 135W SWITCHING POWER SUPPLY.
* FLOPPY DISK CONTROLLER.
* 2 360K HALF HEIGHT FLOPPY DISK DRIVES.
* 8 EXPANSION SLOTS.
* POWER AND TURBO MODE INDICATOR LIGHTS.
* LOCKABLE CASE, ALSO SERVES AS KEYBOARD LOCK-OUT.
* STANDARD 5160 KEYBOARD.
* ASSEMBLED AND TESTED IN U.S.A.

$795

STANDARD AT



* FULLY IBM PC/AT COMPATIBLE.
* 80286 CPU (6MHz).
* 8 EXPANSION SLOTS (5x62 PIN, 3x36 PIN).
* 1 MB MEMORY ON THE MOTHERBOARD.
* 200W SWITCHING POWER SUPPLY.
* CLOCK/CALENDAR WITH BATTERY BACK-UP
* 16 BIT HARD DISK/FLOPPY DISK CONTROLLER.
* 1.2MB FLOPPY DISK DRIVE.
* STANDARD 5160 KEYBOARD.
* UP TO 3 HALF HEIGHT STORAGE DEVICES ACCESSABLE FROM FRONT PANEL.
* HARDWARE RESET BUTTON.
* POWER & HARD DISK INDICATOR LIGHTS.
* LOCKABLE CASE, ALSO SERVES AS KEYBOARD LOCK-OUT.
* ASSEMBLED AND TESTED IN U.S.A.

$1695

PRINTERS

CITIZEN MSP-10	$269
CITIZEN MSP-15	$379
CITIZEN MSP-25	$495
CITIZEN MSP-35	$455
EPSON FX-85	$369
EPSON FX-286	$579
EPSON LX-800	$595
EPSON LX-1000	$695

SPECIAL

20MB HARD DRIVE

$449

PACKAGE INCLUDES SEAGATE 20MB HARD DRIVE, WESTERN DIGITAL CONTROLLER, CABLES, SOFTWARE, OPERATING MANUAL AND MOUNTING HARDWARE.

MONITORS

SAMSUNG HI-RES TTL	$ 89
GOLDSTAR HI-RES COMPOSITE	$ 79
TAXAN RGB 620	$375
TAXAN SUPER-RES RGB 630	$449
TAXAN ULTRA-RES RGB 640	$475

ADD-ON CARDS

MULTIFUNCTION CARD W/384K	$139
MINI I/O (PAR, SER, GAME, CLOCK)	$ 95
COLOR GRAPHICS CARD	$ 99
MONOGRAPHICS CARD W/PAR	$ 99
576K RAM CARD W/OK	$ 65
1200B INTERNAL MODEM	$169

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Computer Products United

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Glendale, CA 91205
Information Call:
(818) 796-8684

TERMS: We accept Cashier's Checks, Visa, Mastercard. Personal checks take 15 days to clear. Call for return authorization number on all warranty repairs. Any unauthorized return subject to a 10% restocking fee.

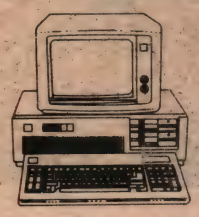
•IBM is a registered trademark of International Business Machines Corp. • Standard Computer is a trademark of Standard Computer Corp. • Microsoft and MS-DOS are registered trademarks of Microsoft Corp. • Taxan is a trademark of Taxan Corp. • Citizen is a trademark of Citizen America Corp. • Hayes is a trademark of Hayes Computer Corp.

VISA MasterCard

in a contest, but already owns one. This Bargain for $1,900 includes monitor, keyboard, 256K, MS-DOS, terminal emulator and manuals. Call **Randy 617-267-4236.**

For Sale: 10mhz, 8086, MS-DOS Seattle Computer Products computer with two 8" disk drives and one 5¼" disk drive. Zenith Terminal with Vector graphics and Anadex 9501, 132 column printer. All for $2,700. **Peter Van,** 5922 Gerling Dr. S.W., Tacoma, WA 98499. **206-588-2809.**

IBM AT Compatible



Leading Edge M-H
$2795

30 Meg Hard Drive, 1.2 Meg floppy drive, 1 Meg RAM, Hi-Res TTL Monitor, AT Style keyboard, clock/calendar, 6 AT Expansion slots, 2 8-bit slots, MS-DOS 3.1, GW Basic. 100% Satisfaction Guaranteed! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

PC Compatible, 256k B RAM, 2 Floppies 1 parallel port, tilt swivel green monitor, MS DOS 30 day warranty $1100. Guaranteed compatible. Add $300 for Okidata ML83A Printer. **Paragon Computer Corporation, 203-525-0389.** 5-78

For Sale: Kaypro Model 2000 MS-DOS lap top, 768 kbytes ram, battery clock, with software and extras, perfect condition, $1450. **David Dixon,** 3208 Jupiter Rd., Las Cruces, NM 88001. **505-522-0596.**

(120A) MS/DOS COMPUTERS WANTED

Eagle Repair - Free Estimates. All models send unit with your phone number to: **Weaver Computer Center,** 7511 N. Tamiami Trail, Sarasota, FL 34243, **813-351-4625.3-77**



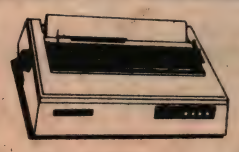
Leading Edge Word Processor
$39
For IBM and All Compatible Systems

"This program is a gem, and at $250, it's also a gem of a bargain!" --PC Magazine, January 28, 1986. Software Digest, an independent publication which accepts no advertising, reviewed and rated 25 word processing programs in its January 1986 issue. These included WordPerfect, Volkswriter Deluxe, WordStar 2000 Plus and Microsoft Word. Software Digest concluded: "the Leading Edge Word Processor offers the best balance of user-friendliness, performance and features of all the programs tested." Basic & Simple Version $39. With Spelling checker and merge/Print Options $49. 100% Satisfaction Guaranteed! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE, 1-800-545-7447.**

Victor 9000 Software wanted, especially interested in WP and terminal programs. Commercial or homebrew, but need documentation. **Steven Slatin,** AmEmb San Jose, APO Miami, FL 34020.

(120B) MS/DOS PERIPHERALS

20 CPS Daisywheel Letter Quality Printer With Automatic Cut Sheetfeeder



$369

Axiom DX 2000 13" letter quality printer with 75 sheet automatic sheetfeeder. Also available, Axiom DX 2500 15" 25 CPS printer with sheetfeeder $419. For more information on these and other super bargains, see ad index for **BCE** full page display ads in red. **BCE 1-800-545-7447.**

Attention IBM WordStar Users
Up To 60% Off



For IBM PC and Compatibles

CorrectStar (Updated SpellStar) - Corrects spelling from 65,000 word dictionary; offers alternative spellings. Just type a word the way it sounds and CorrectStar will find the correct spelling. List Price $145..ONLY $49; MailMerge - Merges files and for personalized form letters; assembles mailing lists and labels. List Price $99..ONLY $49; StarIndex - Creates alphabetized indices and tables of contents. List Price $99..ONLY $49; All 3 - CorrectStar, MailMerge, StarIndex..ONLY $99. For more details on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

DSDD Disks 59¢

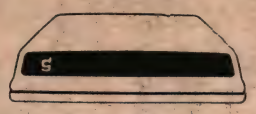


Major Manufacturer - Call for Details

Complete with sleeves and labels. Hub rings, 48 t.p.i., High Quality. 100% Satisfaction Guaranteed. 1000 for .59 each (add $30 shipping), 200 for .63 each (add $8 shipping), 100 for .65 each (add $8 shipping). For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

MS-DOS COMMANDS on sixty 3x5 Roladex(tm) cards. Indexed with command summary & correct syntax. $15.95 (PP & MBG). **Brian Lewis,** 6423 Caracara St., Sarasota, FL 34241. 5-78

Modem Liquidation!



Hayes Compatible 1200 Baud Modem With Communications Software — $149

General DaraComm Acculine 1200. Runs Smartcom, PC-Talk, Crosstalk, and many more. Autodial/Autoanswer, 1200 bps or 0 to 300 bps, external, RS232-C Interface. IBM Compatible Communications Software included FREE! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

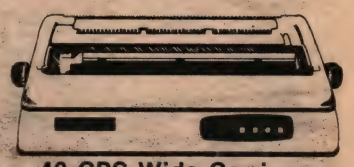
Printer Liquidation



Canon Color Ink Jet Printer — $199

Canon PJ-1080A Ink Jet Printer - 37 cps, 640 dots per line, 7 striking colors, centronics parallel interface. Can be used for overhead projections. Works with all standard IBM graphics packages. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

Printer Liquidation!



40 CPS Wide Carriage Daisywheel Letter Quality Printer
$349

Manufactured by TEC, Commodore 6400, Diablo 630 compatible, 40 CPS, Centronics Parallel interface, 2K buffer, bi-directional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

AFFORDABLE HARD DISKS FOR YOUR Z80

HARD DISK SYSTEMS by Emerald Microware

Now is the time to take advantage of the low prices on hard disk drives. We have everything you need from the host board to a complete turn-key system for your computer, order only as much as you need. Runs on Xerox 820-1 or -2, Kaypro, or most **ANY Z80** based system.

HDS Host board
- Plugs into Z80 socket, no wiring required (special 50 pin host is available for Kaypro 84 series computers)
- Interfaces directly with 40 pin Western Digital 1002 series controller boards
- Comes fully assembled and tested
- Switch selectable I/O addressing

HDS Software package by MICROCode Consulting
- Drivers locate above your existing operating system and BIOS, so it will not interfere with your other programs that install down below.
- Custom installs for your system without having to assemble any software
- Reserves system tracks and swaps so you can Warm Boot from hard drive
- Allows installation of up to two hard drives and two 5 ¼" floppies on one WD1002-05 controller board
- Runs diagnostic on system each time hard drive is installed
- Can be configured for 5 to 40 Meg hard drives, from menu or custom install
- Includes manual, FORMAT, TEST, PARK, INSTALL, and SWAP utilities

Western Digital 1002-05 Hard Disk Controller Board
- 5 ¼" profile with standard 5 ¼" power connection (only 5 VDC required)
- Has WD2797 floppy controller and interface on board
- Can control up to three hard drives and four 5 ¼" floppies.
- 40 pin host interface
- ST506 compatible hard drive interface

HDS TURN-KEY HARD DISK SUBSYSTEM by Emerald Microware
- External hard disk subsystem complete with all cables, controllers, hard drive, and cabinets with power supply, fully tested and burned in. Host adaptor and full installation kit supplied with software on disk format of your choice.
- Internal hard disk subsystem for '84 series Kaypro computers, complete with host, controller, cables, 3 ½" hard drive, mounting hardware, and fan.
- Available as 10, 20, or 40 Meg, single or multi-drive systems
- External units available with both hard disk and 5 ¼" quad density floppy drives installed

10 Meg Single drive Subsystem	$ 795.00
20 Meg Single drive Subsystem	$ 995.00
Host board with software package	$ 89.00
WD1002-05 Hard disk controller board	$ 185.00
WD1002-05 controller with Host and software	$ 250.00
20 Meg with dual 5 ¼" floppy subsystem	$1295.00

XEROX BOARDS AND ACCESSORIES

We stock a limited quantity of Xerox parts and accessories for the 820 computers.

Xerox 820-2 Main Computer Board	$ 95.00
Xerox 820-2 Floppy controller board	$ 75.00
Xerox 820-2 Main board with floppy controller board	$150.00
Xerox 5 ¼" disk drive cable	$ 12.00
Xerox internal video harness with brightness control	$ 9.00
Parallel ASCII keyboard (no numeric pad) with docs	$ 25.00
PC mount power connector for 820 board	$ 2.50
Dual half height, 5 ¼" disk drives (new), DSDD - 48 TPI, in cabinet with Xerox standard cable	$265.00
Dual half height, 5 ¼" disk drives (new), DSQD - 96 TPI, in cabinet with Xerox standard cable	$295.00

We guarantee satisfaction on all of our products or your money back. Include $4.00 shipping and handling, $7.00 for COD, call for Blue Label charges. Phone hours: 8:30am to 5:00pm weekdays; modem hours: 10:00pm to 8:00 am seven days a week.

WE SUPPORT OUR CUSTOMERS

Is single density making your Xerox 820-1 feel crowded?

DOUBLE DENSITY FOR THE XEROX 820-1 OR BIG BOARD I

Clearly the most versatile double density package available for the 820-1. Lets you run up to four disk drives at once, and mix 5 ¼" & 8". Runs almost all Kaypro and Xerox 820 software. Supports all standard printers and most add-ons such as the Ferguson ram board. Our ROM sets operate in banked mode to allow more space in the TPA for your programs. You get Mini-monitor functions, autoboot capability, automatic disk identification (up to 19 formats built in), IOBYTE enabled for device selections, and you can read and write 48 TPI disks on 96 TPI disk drives.

X120 Board - assembled and tested - with ROM set	$160.00
X120 Board - full kit - with ROM set	$140.00
X120 Bare board with ROM set	$ 72.00
X120 Bare board only	$ 26.00
ROM set only	$ 50.00
Hard to find parts set (trimmers, caps, resistors)	$ 12.00
WD2793 controller chip	$ 22.00

Other packages available.

Can't find CP/M for your Xerox? Now you don't need it.

QP/M by MICROCode Consulting

At last, an inexpensive replacement for CP/M, and you don't need CP/M to get started! Get full CP/M compatibility with many new options. Stamp your file with the time and date - transparent to your operation, automatically re-log your disks (no more control C), change your default drive search from the keyboard, use up to 31 USER areas, select your disk drives or user areas with semicolon or colon, maintains ARCHIVING bit for efficient backups (great for hard drives), and much, much more. Runs in native Z80 code, in the same space as CP/M 2.2. Has menu oriented install for use on ANY Z80 based system. Available as a bootable disk (with BIOS) for the Xerox 820-1, 820-2, 820-XPRO, 820-PLUS2, or Kaypro.

QP/M, bootable for the Xerox 820-1, 820-2, or Kaypro	$ 80.00
QP/M, bootable for the Xerox 820-1 using XPRO or PLUS2	$ 65.00
QP/M, without BIOS (not bootable)	$ 60.00

Tired of carrying your computer back and forth? Why not just the diskette?

UNIFORM and UNIDOS by Micro Solutions

The solution to the diskette incompatibility problem. This program allows files to be transferred back and forth between close to a hundred computer formats including between CP/M and MSDOS. Lists computers by name - no special technical knowledge required. Versions available from stock for the Kaypro (XPRO), Xerox 820-2, Morrow MD2&3, and IBM 100% compatibles. Other versions available on request. Unidos allows you to run CP/M 80 programs on your IBM compatible. Requires NEC V20 chip on P.C.

Uniform or Unidos	$ 64.95
IBM Uniform with Unidos and V20	$145.00

PANASONIC HALF HEIGHT DISK DRIVES

These are some of the finest new 5 ¼" disk drives. They are fast, reliable, and have about the lowest power consumption around.

National JA551 (Shugart 455) - DSDD, 48 TPI	$114.00
National JA561 (Shugart 465) - DSQD, 96 TPI	$129.00

EMERALD MICROWARE

P.O. BOX 6118 ALOHA, OR 97007 (503) 642-1860



*FANTASTIC DEALER PRICING

EXTERNAL MODEMS

300-1200 Baud

- Auto Answer
- Auto Dial
- Free Communications Software
- Many Extras

$115.00

THIS MONTHS SPECIALS

* TURBO MB 640K RAM Max. W/OK..... **165.00**
* 640K RAM Expansion W/OK..... **40.00**
*256K 4.77 MHZ. Mother Boards W/OK..... **85.00**

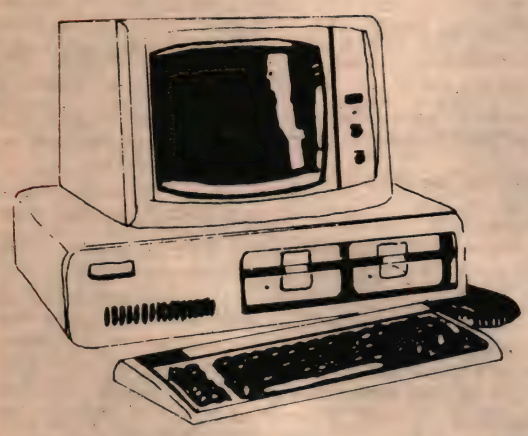
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220V or 110V
Ready for Hard Disk Tape Drive & Internal Modem

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IBM COMPATIBLE



SYSTEMS

640K Mother Board 4.77 MHZ W/OK	125.00
256K RAM	35.00
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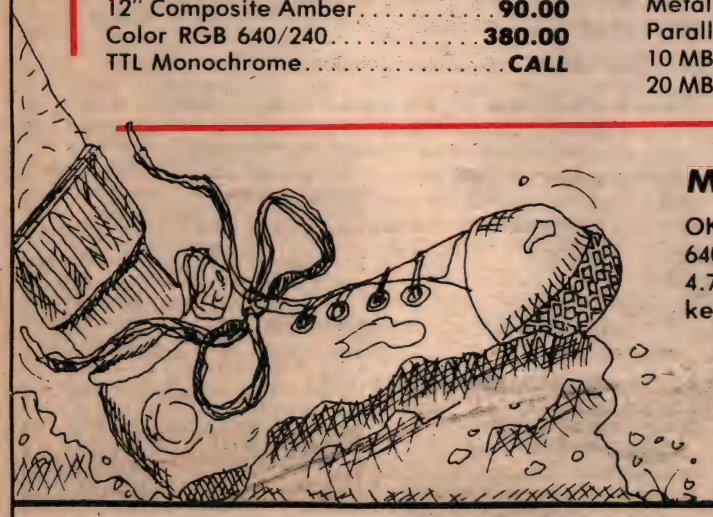
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TURBO MOTHER BOARDS

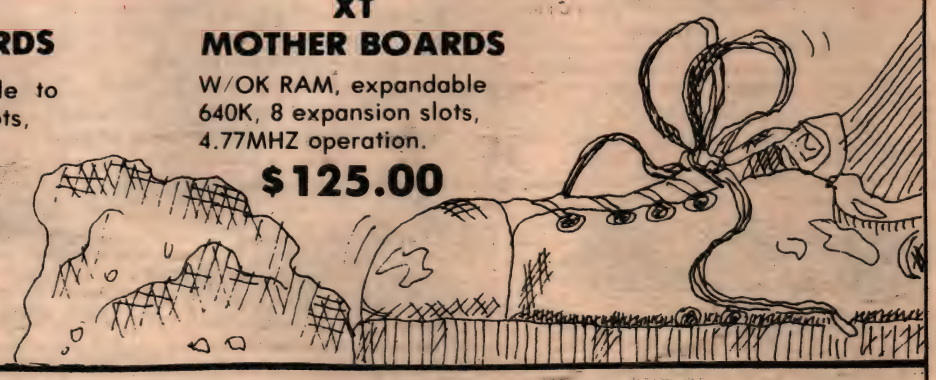
OK RAM, expandable to 640K, 8 expansion slots, 4.77MHZ & 8MHZ, keyboard selectable.

$165.00

XT MOTHER BOARDS

W/OK RAM, expandable 640K, 8 expansion slots, 4.77MHZ operation.

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NEC Dot Matrix Printer
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NEC PC-8027A -- Transportable, complete graphics capabilities for IBM, Apple, etc. 105 CPS. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

(121) KAYPRO COMPUTERS FOR SALE

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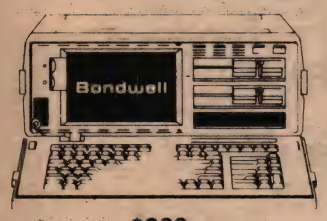
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Kaypro 10, many extras, software, cable, keyboard templates, padded carrying case. Perfect condition $1,600. **813-541-6438.**

Portable CP/M Computer with Wordstar



$399
Reads Kaypro and Osborne Software

The Bondwell Model 12 Cp/M computer - 64k RAM, Dual 180k SSDD Disk Drives, $399; Also available, Model 12A - 64K RAM, dual DSDD 360K Disk Drives, $449; Model 14 - 128K RAM, Dual DSDD 360K Disk Drives, $499. Complete WordStar, MailMerge, ReportStar, CalcStar, DataStar package included free! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

(121A) KAYPRO COMPUTERS WANTED

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Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

Wanted Kaypro Robies cheap. Prefer bad or no drives. Send low dollar offers to: **David Borders,** PO 668, Glasgow, KY 42141.

(121B) KAYPRO SOFTWARE, PERIPHERALS

43c/PROGRAM for the best 70 **KAYPRO** public domain programs - including 16 games (adventure, blackjack), 40 utilities, 13 application programs and Modem7 (Kaypro version). Send $30 for 6 disk set to **PUBLIC DOMAIN USERS GROUP,** Box 1442-K1, Orangepark, FL 32067. 5-78

BUSINESS MASTER for Kaypro CP/M-80. Includes G/L, A/R, A/P, Inventory, Payroll. Still sealed. $75 or best offer. **Sofplex, Inc.** 361 N. Fuller Ave., Los Angeles, CA 90036. 213-939-3076. 5-78

[illegible] D-320 2.6Mb. Latest model, use on Robie, etc. [illegible] for 1 hour usage, guaranteed. $350; single $600 pair. 3 new preformatted disk $95 with drives, $125 without. Call **502-651-9050** evenings or write **David Borders,** PO 668, Glasgow, KY 42141.

INVESTORS! Use your Kaypro and our Technical Analysis program to improve your marketing knowledge and trading advantage $99.95 or $199.95. Compu/CHART2 offers user-assigned Moving Averages, Point/Figure, Ocillators, Volume, Comparisons, printouts, interpretation guidelines, more! **NewTEK Industries,** PO Box 46116, Los Angeles, CA 90046. **213-874-6669.**

RAMDISKS AND COPROCESSORS for CP/M Kaypro's. SWP 256k Copower88 with ramdrive $195; SWP 1024k Copower Plus with ramdrive $375; Microsphere 1024k Ramdrive with 64k print buffer $350. Call **502-651-9050** evenings or write **David Borders,** PO 668, Glasgow, KY 42141.

(123) SANYO COMPUTERS FOR SALE

(123A) SANYO COMPUTERS WANTED

Sanyo 55X in good condition **wanted.** Send information and price to: P.O. Box 52673, Tulsa, OK 74152. 5-78

(123B) SANYO SOFTWARE, PERIPHERAL

BPI Accounting Package for Sanyo 1000. New Unopened compelte system retail $695. Liquidation price $69.50 plus postage. **GB Consulting Services,** Box 83, Laurel, MD 20707. **301-498-0121.**

Domain/Commercial Software! Rent DS/DD Diskfulls of SANYO 550/5 software for $1, Buy $3 (including disk). **804-851-6864. Colony,** Box 808, Langley AFB, VA 23665.6-78

OPUS 6 & 7

New Update to the OPUS terminal programs. OPUS 6 & 7 are 'State of the art' SMART terminal programs for the Sanyo 550/555. The OPUS series feature: Auto Logon, Auto Key, Hi speed XMODEM, DC2/4, manual ASCII capture, full parameter control, DOS disk utilities, full control STOP WATCH, clear screen toggle, printer toggle, SPLIT SCREEN conference mode, ON SCREEN MENUS at all times, WINDOWS for option selection, interrupt driven — fully buffered (so no data is lost coming or going), etc. OPUS 6 is for the standard Sanyo. OPUS 7 is for the Sanyo with Video Board. OPUS 6 and 7, with manual. $37.95 PP.

OPUS 8

Now available for the IBM PC/XT. Clones, and true Compatibles. OPUS 8 is a smart terminal program containing all the great features of the OPUS series (see above.) OPUS 8 for IBM, with manual. $37.95 PP.

OMEGA

OMEGA is a window program with a graphics CLOCK, 30 year CALENDAR, and spelling LEXICON. OMEGA can be called up from WordStar, EasyWriter, or any program, anytime. The OMEGA disk contains OMEGA (standard Sanyo), OMEGA1 (Video Board Sanyo), and the source codes. The OMEGA disk, $20 PP. **Bob Jack Software, 8371 White Rd., Burbank, OH 44214, 216/948-2059.** 5-78

Public Domain Software for Sanyo 55X. 100s of free programs for small copy charge. Games, financial, databases, assembly language, more. Detailed catalog $1 (refundable). FREE NEWSLETTER with catalog. **SOFTWARE LIBRARY,** POB 204, Prosser, WA 99350.

SANYO 550/555
PUBLIC DOMAIN RENTALS

110 VOLUMES-RENT AND COPY for $1 each or we copy for you $3 SSDD; $6-DSDD. Sampler $5. Mastercard, VISA! Recorded info/order **(619) 941-3244** (anytime), or LSASE (specify computer): **Futuresystems,** Box 3040(C), Vista, CA 92083.

SANYO FUNCTION Key Temp-Plates(tm) for MBC-550/555 series computers. 10 preprinted Temp-Plates — WordStar, CalcStar, EasyWriter, MS-DOS 2.11, Sanyo BASIC, GW-BASIC, dBASE II, Lotus 1-2-3, PC-File III, and PC-Write plus 2 "fill-in-your-own" Temp-Plates — all 12 for $9.95 postpaid. Cash, check, MO — no COD or credit cards. **Shoreland Computing,** 711 Clinton Street, Grand Haven, MI 49417. 4-77

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"Sanyo MBC 550/555 Beginner/Intermediate Guide." 360+ pages 2nd disk with 56 programs. $29.95 postpaid USA/Canada. VISA/MC okay. **818-346-7024, Fred Biechman,** 7217 Bernadine, Canoga Park, CA 91307. 6-79

Sanyo Source List. There are lots of programs, software packages, and hardware available for your Sanyo 55X. Where to buy and what's available? This list gives description, address, all available data, for 100s of programs and products. Arranged by company and subject. Just $3. **CONCEPTWARE,** POB 204, Prosser, WA 99350.

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Sanyo Stuff for your MBC 550 and 555: WORK FORCE 1 Project Management with Q Writer and Label Baby $34.95; SANYO TOOLKIT like the Norton Utilities but for Sanyo $22.95; RAM DRIVE software (needs 256k) $24.95; EW2ASCII converts Easy Writer files into ASCII text readable by Wordstar, MCI mail etc. $22.95; CYBERLOG one disk filled with Sanyo information and P/D software. If you buy one disk this year, get this $24.95; Order two and take a 20% discount. IBM-SANYO compatibility chart free with any order. guaranteed and postpaid from: **CYBERSOFT,** Drawer 5807, Wynnton Station, Columbus, GA 31906-0807. 5-77

Survey-Boundary 55X/675 (specify) MS DOS 2.11 basic $29.95. Description $1. **P. Billings,** 12134 Bonnie Terr. Dept. CSA, Seminole, FL 33542. 6-82

Survey-Boundary 550/555 MSDOS 2.11 $29.95. Manual only $1.00. **P. Billings,** Dept. CSA, 12134 Bonnie Terr., Seminole, FL 33542. 1-77.

XENO

This disk contains the famous XENO disk editor, and a whole set of utilties and game programs. With XENO, you will be able to look at and change any byte on any disk. All these programs come with source codes. We have placed theses programs in the public domain, however when you consider the charge of BBS time, PHONE time, and YOUR time to get the whole set, it's cheaper to send for your disk. XENO disk, $15PP. **Bob Jack Software,** 8371 White Road, Burbank, OH 44214. 5-77

(125) SINCLAIR COMPUTERS FOR SALE

TS-1000, A&J microdrive, mindware printer, software, manuals and books. All for $75. Call **713-694-1732.** TS-1000 needs 16k module.

(125A) SINCLAIR COMPUTERS WANTED

(125B) SINCLAIR SOFTWARE, PERIPHERAL

2068 BANNERS with your 2040 printer. Includes alphabet, numbers, punctuation. Easy to run. Sample $2. SASE. Cassette $14.95 PP. **David Trevor,** Box 46208-T, Phoenix, AZ 85063. 11-78

CLOSEOUT! TS1000/ZX81 software from 99¢. SIMULUSION-CS2, Box 2382, LaJolla, CA 92038. 4-78

Computer Hardware expansion projects you build yourself, our step by step manuals show you how. Catalog $2 refundable on first order. **Kluge Systems,** PO Box 297, Little Creek, DE 19961.

FREE CATALOG Timex Sinclair Hardware and Software. Books Spectrum programs. QL Information British Magazines. **Curry Computer,** PO Box 5607, Glendale, AZ 85312-5607. 602-978-2902. 4-80

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FREE CATALOG, Timex Sinclair 1000, 1500, 2068, Spectrum and QL. **Basically Programming,** Dept. C, 2528 W. Olive Avenue, Fullerton, CA 92633. **714-738-0666.** 6-83.

FREE CATALOG

QL or QL, TS2068/1000/1500, ZX81 hardware, software, peripherals. Special Sale! **Russell Electronics,** RD1, Box 539, Centre Hall, PA 16828. **814-364-1325.**

FREE PROGRAMS!!
Timex-1000/Timex-2068/Timex-1500/ZX-81/IBMpc's/Adam/Apples/TRS80's/Commodores. Send postage stamps! **EZRAEZRA,** Box 5222-PMY, San Diego, CA 92105.

New Boox 200 Computer Programs in basic for the T/S-1000, Z/X-81, T/S-2068 $7.95 + $1.50 p&h. **Bit/s Software,** 3202 W. Fillmore, Phoenix, AZ 85009. 6-79

QL CATALOG

SOFTWARE-HARDWARE-BOOKS MAGS-ACCESSORIES. We are an **authorized Sinclair dealer-QL-Flat screen TV-QL/SW Disk interfaces, RAM expansion,** printers, Centronics interfaces. **Software: I.C.E., GRAPHIQL, ZKUL, SUPERCHARGE COMPILER, CONCEPT 3D,** assemblers, graphics and business packages, games and utility software, Sinclair Research software. **And Much, Much more.** Write for **Free Catalog** to: **Curry Computer,** PO Box 5607, Glendale, AZ 85312-5607. 1-602-978-2902. **Open** 7:00 am to 5:00 pm MST M-Sat. **Open Till 9:00 PM MST Tue. & Thurs.** 3-77

QL PACKAGE UNDER $300.00
QL Computer with -128k, expandable to 640k, 4 business pkgs. included: Word Processing, Database, Spreadsheet, Business Graphics. 2 Serial ports, 2 Joystick ports. LAN for up to 64 machines. PLUS Utility program $17 value; PLUS FREE Subscription QL Report $15 value; PLUS 8 FREE programs; memory checker, music prg, graphics picture prgs, calculator and more. plus -FREE Ground Shipping in continental U.S. -Call for Price -ALL FOR UNDER $300. **Curry Computer,** PO Box 5607, Glendale, AZ 85312-5607. **602-978-2902.** 6-80

Survey-Boundary T/S-1000 $19.95. Description $1. **P. Billings,** Dept. CSC, 12134 Bonnie Terr., Seminole, FL 33542. 6-82

Survey-Boundary program Sinclair T/S 1000 $19.95. Manual only $1.00. **P. Billings,** Dept., CSC, 12134 Bonnie Terr., Seminole, FL 33542. 1-77

THE QL REPORT

A MONTHLY NEWSLETTER published in the U.S. for QL owners and those interested in the QL. Software reviews, books and hardware reviews, interviews with programmers and QL companies — and more. $15 for 12 issues. Published by: **Curry Computer,** PO Box 5607, Glendale, AZ 85312-5607, **1-602-978-2902.** 3-79

TS1000-1500 Adventurer's (16K RAM) all new adventure-Survival game with a twist (The Island) the twist is if you survive (make it to the end) you will find a secret number. Send this number to us and we will issue a verified survival certificate. Each game costs $10.00 on cassette (postage included). California Residents add 6% tax. To order or for free literature write: **O.F.A.,** P.O. Box 235, Oakdale, CA 95361. 1-77

ZX-81/TS1000 "I Ching" program. Random "Coin Toss" draws first three hexgrams, prints results. Source listing $3 pp. Including documentation, flowchart. **Delphic Software Programs, Packet Export Co.,** PO Box 2155, Jenkintown, PA 19046.

(126) MISCELLANEOUS MICROCOMPUTERS

Basicfour 410B disc drive, 14 MB fixed 6400 Mag tape. cart drive, 64KB printer, 150LPM, 2 terminals, complete system never used. **212-924-5749.**

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All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

EAGLE II Microcomputer CP/M 2.2, 2-drives, with Wordstar, Spellbinder, and BASIC. Like New! $550. Send to — **Dr. Smith,** MEDDAC, APO, NY 09105.

Epson PX-8 Geneva. Includes 64K multiunit, portable printer, cables, and software (Wordstar). Perfect condition, complete with original boxes and manuals. $900 or trade for QX-16. Call evenings **405-529-2715.** 5-78

Exorciser II 6089 development system. Fully equipt with two 8" floppy disk drives, Exorterm 155, prom burner, complete in-circuit emulation package, all software needed for program development plus full system software library, all original documentation included. No reasonable offer refused. **Call Microfirst Associates Inc., 201-445-7095.**

For Sale. Vector 4/30 with one 5 meg Winchester & ome 5¼ DS Quad density drive; includes Data Manager Execuplan & comm. software $750. Call **Jim (303)879-4832.5-77**

Forthcard: Rockwell 65F11 microcontroller. STD bus card with 8k NVRAM, serial port, 16 I/O lines, EPROM programmer, card cage $200. **Jerry Mueller,** 1163 Naples St., San Francisco, CA 94112. 6-78

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IBC MIDDI-CADET HP or multistar wanted. 512K memory and 40mb hard disk drive. **608-269-8711.** 5-77



$$$$ PDP/8-M Collectors Item. CPU only $199 no warranty. Looks really good on your bookshelf though!! **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111. 6-82.**

Liquidation - Televideo TS 1603 Computer, complete, includes CP/M 86, Comes with WordStar (MS-DOS) and CalcStar (MS-DOS). Tested/guaranteed. Limited quantity $550 plus shipping. **301-498-0121.**

MAGIC COMPUTER Z80 4MHz + 6502 I/O processor [illegible] software, transportable 12 inch green screen [illegible] 64KB, two DSDD Teac keyboard w/keypad video, console, parallel, RS232 ports. **212/719-5555** 9am-5pm, 749-0295 6pm-11pm. 4-80

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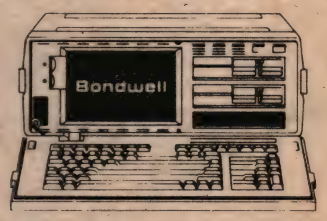
Micrographic Microloop 1100-Pulmonary Function Screener--Computer for Medical Diagnosis-Inquire for more info. **Len, 212-777-4353.**

Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 5-81

Morrow MD-2 Qume QVT-102 terminal, loads of software. Make offer. **Gene, 501-376-3633** days. 5-77

Otrona Attache 8/16 - 640K Memory Upgrades $260; Attache 8/16's $1000 - Parts & Repair Service available. Call or Write: **D & L Enterprises, 303-452-1409,** 11506 Adams St., Thornton, CO 80233. 6-81

Portable CP/M Computer with Wordstar



$399
Reads Kaypro and Osborne Software

The Bondwell Model 12 CP/M computer - 64k RAM, Dual 180k SSDD Disk Drives, $399; Also available, Model 12A - 64K RAM, dual DSDD 360K Disk Drives, $449; Model 14 - 128K RAM, Dual DSDD 360K Disk Drives, $499. Complete WordStar, MailMerge, ReportStar, CalcStar, DataStar package included free! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

Rockwell Aim Computer complete with ED/ASM, Basic, power supply, all documentation. Asking $150. Call evenings **201-569-0819, John Bockelmann,** 174 Jefferson Ave., Tenafly, NJ 07670. 6-78

TeleVideo TS-802 dual floppy Computer with WordStar, CalcStar, and either Accounting Plus or Business. Master integrated accounting software. Little used. $1825. **Harry Beerman,** 2510 Wysstead Drive, Fort Wayne, IN 46819. **219-639-3035.** 5-77

Televideo Comptuers TS801 w/8in. drive $500; TS 806/20 $1200; TS 816H/40 $2200; Apple II + loaded $700; cogitate enhanced file by file backup utility for TS816/H40 $50; RS422 board for TS803 $50. **Richard Seale, 303-449-4897/443-4681.** 6-78

Vector Graphic VSX-3000 with 640K; 10Mb hard disk; 714K floppy. **Dick Sperry, 203-355-2631** (9-5 PM) or **355-3525** (eves.). 5-77

Vector Graphic 4/30 5Mb hard disk 630Kb floppy CP/M 8 & 16 bit CPUs. NEC 7700Q printer for Vector Graphic, 50 pin parallel interface. Complete with manuals and supplies. **M. Richman,** 5113 Memorial Hwy., Tampa, FL 33614. **813-885-1789.** 6-78

Wanted: Used Morrow MD3, MD5, MD11 computers cheap. **Robert Stevens,** 64 Arcade, Soekonk, MA 02771. **617-336-8938.**

Z:10G Model-II, unit, 20 Meg drive, cartriage tape, 8 serial ports, 1 parallel, 512K memory, 2 terminals, expandable. $5000. **904-478-1591.** 6-80

Zilog MCZ1/25 microcomputers (unused) Z SSSD 8-inch, Z-80, etc. Runs RIO. Also many unused spare boards and power supplies. **(817)566-2196.** 5-77

(127) XEROX COMPUTERS FOR SALE

XEROX MODEL 515 console w/8 in. floppy & hard disk unit, 2 Wyse interface terminals, Datasouth Dot Matrix printers. **Neurosurgical Consultants, PA,** 200 S. Kings Highway, Cherry Hill, NJ 08034. 4-77

Xerox 820-2 Disc Drives, manuals, software, $800. **Call 717-392-6107, Harry Jackson,** 125 S. Duke St., Lancaster, PA 17602. 6-78

(127A) XEROX COMPUTERS WANTED

(127B) XEROX SOFTWARE, PERIPHERAL

8/5 SYSTEM NOW RUN 8 INCH AND 5¼ INCH DRIVES ON 820-1 $59.95

New bios for cmp allows simultaneous operation of up to four 5¼ and four 8 inch floppy disks on the Xerox 820-1 simultaneously. Supports 8 inch single or double sided (241k/482k storage respectively) and 5¼ inch single or double sided 40 or 80 tracks (350k storage on 80 track ds), up to four drives each. Adapter board plugs into 820-1 at disk drive cable port. Requires ribbon cable type drive cables. Complete with a&t adapter board, plus all the features of super bios below.

SUPER BIOS $39.95

350k storage on 80 track double sided 5¼ drives. Supports 40TSS, 40TDS, 80TSS, 80TDS simultaneously, two total drives. Includes source, format, single drive copy, and sysgen programs. Also includes new monitor eproms which allow boot from either keyboard or a seperate terminal, and also allow the Xerox to function as a stand alone ASCII terminal without disk drives.

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With the purchase of either of the above systems, we offer MRS/OS, a completely CPM compatible operating system, for an additional $19.95. This system comes on bootable disks and runs all commercial CPM software. Includes users manual.

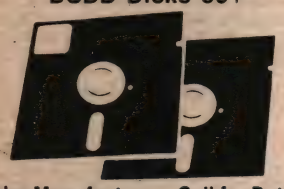
XEROX 820-1 VIDEO ADAPTER $17.95

Inputs Xerox video signals and outputs proper composite video for monitors. A&T PC board with all proper connectors. Requires minor soldering on the 820-1.
Eugene M. Toner, PO Box 69, Fountainville, PA 18923. Check, M.O., VISA, MC. **215-249-0240** 9am to 5pm daily orders, 6:30pm to 10:30pm EST Thursday for technical questions.

— BIG BOARD BUILDERS —

KEYBOARDS $25. See "APPLE BUILDER KEYBOARD" ad in category 108 for a super, full ASCII, 83 key keyboard which also works great with the Big Board/820 series computers. Thanks, **Electrovalue Industrial.** 12-82

DSDD Disks 59¢



Major Manufacturer - Call for Details

Complete with sleeves and labels. Hub rings, 48 t.p.i., High Quality. 100% Satisfaction Guaranteed. 1000 for .59 each (add $40 shipping), 200 for .63 each (add $8 shipping), 100 for .65 each (add $8 shipping). For more information on this and other products, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

(128) MISC. MICRO, SOFTWARE, PERIPH.

1000's of FREE SOFTWARE programs for over 80 computer formats including **IBM, CP/M & COMMODORE** from the **PUBLIC DOMAIN USERS GROUP.** Over 8500 members worldwide. For information send large SASE to **Public Domain Users Group,** Box 1442-C3, orangepark, FL 32067. 5-78

5 Megabyte hard disk drives, 2 for $100. These are 8" SA1002 Shugart Winchesters. Controller kit $200. Will interface to most computers: 6809, Z80, STD, S-100, Flex, CP/M, Apple, Heath. **Digital Search, 803-877-9444.**

8 in. Morrow drive w/power supply $125; 47 8 in. disks $10; 70 8 in. disks of most useful public domain software $50; 100 Wang 2200 series 8 in. disks $30; 6 ITT six buttons phones $10 each; phone headset $30; RS422 board for Televideo TS803 $50; IEEE488 board for Okidata 92/93 printer $50. **Richard Seale, 303-449-4897/443-4681. 6-78**

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Digitizer Program enables digitizing on your plotter, IBM-PC or MS-DOS computer. Automatically writes CNC program. FREE BROCHURE. Other CNC, NC programs, programming, consultation available. Write stating needs. **MID-OHIO SYSTEMS (CS1),** Box 207, Brice, OH 43109.

Diablo Disk drives, 5 meg disk packs, Diablo PS, disk pack cabinet, card cage, data cassette unit, PS, misc video games, keyboards, clocks. **GCS,** POB 68, Barboursville, WV 25504.

Domain/Commercial Software! Rent DS/DD Diskfull of Clone/MS-DOS Software for $1, buy $3 (including disk). Call f/Trades/Clubs. **804-851-6864. Colony,** Box 808, Langley AFB, VA 23665. 6-78

IBM PC AND CLONES
SANYO 55X & COMMODORE PUBLIC DOMAIN RENTALS

6000+ Programs - Over 600 disks! 458-IBM, 110-Sanyo, 43-C64 Volumes Rent and copy for $1 each or we copy for you! $3 SSDD; $6 DSDD. Sampler $5. Mastercard, VISA! Recorded info/order **619-941-3244** (anytime) or LSASE (specify computer): **Futuresystems,** Box 3040(C), Vista, CA 92083.

Vector Graphic Model 4 dealer demos. Each with 256k, 596k floppy and 10meg hard disk. Complete line of Vector software, including; word processing, spreadsheet, database, office management, communications and Accounting. Complete package for $1000. **Patrick Travis,** PO Box 1536, Springdale, AR 72765, **501-521-0638.**

(129) S-100 COMPUTERS

3 functioning computers, N.S. Horizon, Micromation (2x8"), California Computer (2x8" & 2x5 ¼"). All with prom monitors and CPM 2.2. All parts to build 4th. Extra RAM, I/O, disk controller, extender, and 256k RAMdisk boards, 4 Soroc IQ120 terminals. All documentation and schematics. $2000. **Stephen Douglass,** 348 Edgemeer Place, Oberlin, OH 44074, **216-775-2492.**

Advanced Digital S-100 Super 186 board. 8MHZ. 2 serial pods and 1 parallel pod included. $350. **Frontenac Designs, 607-387-5303.** 5-77

COMPUPRO DISK 1 $150. Disk 1A $295. Disk 3 $250. Interface 3/8 $275. M Drive H $275. Interfacer 4 $185. All excellent. Phone **415-651-5931.** 5-78

CompuPro 816 System. CPU 8085/88, 256K Ram 17, System Support I, Disk I, Interfacer 4, 2 8" disks, 512K M-Drive, Wyse terminal, WordStar, Spellstar, Pascal & Basic included plus over 50 MB of diskettes thrown in $3500 OBO. **714-644-6215.** 6-78

Compupro System - includes RAM17, Z80B, Disk1, Interfacer 4, Sys Support, Integrand 15-slot with 2 Tandon 8-in thinlines builtin (1.2 Meg each), CPM 2.2, all cables $995/BO; MDrive/H 512k $295/BO; Multi-user Oasis (Compupro Z80) $295/BO. **Dave 415-946-4488.**

FREE SUBSCRIPTION

to THE STATEMENT with purchase of any item from this ad.
** USR S-100 modem-300/1200 ..... $179
** SG 64K RAM-flexible! $89
** Cromemco ZPU Z80 4Mhz $79
** Relay card-8ch. w/iso $89
** SD VDB8024 video $129
** SSM 2708/16 EPROM burner $79
Items EXC used, untested, documented. 10 day return privileges w/20% restocking fee. Add UPS, tax (WA). Mailorder only — NO TELEPHONE LISTING. **S-100 Board Bank,** Dept. C3, Box 344, Olympia, WA 98507.5-78

ITHACA INTERSYSTEMS DPS-1 S100 mainframe front panel lights and switches CP/M D.O.S. 64K 2-RS232 2-par ports over 2 Meg+ on line w/8" DSDD drives included good condition with manuals and prints $1200, negotiable. **Charlie 607-798-7111.5-77**

L/F Technologies Systems (formerly IMS, International). We have several Z-80 8-bit S-100+ user boards at half price. Call us for your hardware requirements. **Beerman's Business Computers,** 2510 Wysstead Drive, Fort Wayne, IN 46819. **219-639-3035.** 5-77

LOMAS LDP72 floppy controller, never used, complete with documentation $100. **UCI MEMORY** board useable either as ½ **MEG** with 64k chips or **2 MEG** with 256K chips. new complete in box, never used, documentation included, no RAM installed, $250; **TEI** 12 slot microframe, industrial strength power supply, rack mount with slides, never used- $150; **TEI** 3-bay disk frame, will hold and power 3 full height 5¼" drives, can be floppies, hard drives, or tape drives, in any combination, never used $100; Two CDC 96 tpi floppy drives #9409T never used $50 each. **IBM** PC keyboard, used, $75; First $70... get it all. Call **Bill ...023-3068.**

LOMAS T186 w/CCPM and DR C compiler $600. Sakata SC-100 color monitor and micro sprite CGA $200. Call **512-331-9243.** 5-77

Micropolis/Vector Graphic Users Group Monthly newsletter, hardware, software. **205-881-1697,** 604 Springwood Cir., Huntsville, AL 35803-1740. 5-81

Northstar Horizon 12-slot (S-100) mainframe with two serial and two parallel ports. $300 or best offer. **914-462-7928 evenings.**

S-100 CARD SALE!!

S-100 ENTHUSIASTS! Write the S-100 BOARD BANK for savings on USED items. Subscribe to THE STATEMENT, the irregular, official organ of THE S-100 BOARD BANK. Send $4.37 or more to **S-100 Board Bank.** Mailorder Dept. C2, Box 344, Olympia, WA 98507. 1-77

S-100 Modem $179

S-100 Modem Sale!!! U.S. Robotics 300/1200 modem—plugs into s-100 bus. Auto-answer, auto-dial, full duplex, originate, answer modes. LIMITED QUANTITY at SALE PRICE —$179!!! Used, untested, documents, software disk. 10 day return privileges w/20% restocking fee. Add UPS, tax (WA). Mail order only-NO TELEPHONE LISTING. **S-100 Board Bank,** Dept. C3, Box 344, Olympia, WA 98507. 5-78

TWO IMS Multi-user computers. First: 40 meg. hard disk. Twelve slot chassis, takes seven slaves, four installed. $2900 plus $700 per user. Second: Two 24 meg. hard disk. 22 slot chassis, 12 slaves installed. $3800 plus $700 per user. Both 8 bit 64K, Z80A CPU. TurboDOS 3.1, ReaWorld MBSI accounting package and other software available. **Kamex Construction,** 119 E. Adams, LaGrange, KY 40031. 502-222-1500. 5-78

Vector Graphic 4/30 5Mb hard disk 630Kb floppy CP/M 8 & 16 bit CPUs. NEC 7700Q printer for Vector Graphic, 50 pin parallel interface. Complete with manuals and supplies. **M. Richman,** 5113 Memorial Hwy., Tampa, FL 33614. **813-885-1789.** 6-78

WANTED FOR RESALE!!!

*** **CP/M Software** and/or Documentation (original) *** Advanced Digital Cards *** Operating Systems (Turbo-dos, MP/MII, etc.) *** Advanced Digital Cards *** CCS Cards *** Pal Programmer *** ROM Programmer *** Cat-100 Schematics/MOD info *** Graphics cards *** 256K RAM ICs *** Winchesters *** 1Kx1K Hi-Res Monitors *** Electralogics RAMDisks *** Floppy Drives *** All items MUST be attractively (!) priced, or trade. State Best Prices— please, no "Make Offers". Mail order only—NO PHONE LISTING. **S-100 Board Bank,** Dept. C3, Olympia, WA 98507. 5-78

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BOARD BANK BUYS 'EM ALL! (Well, almost.) ROM, RAM, CPU, VIDEO, GRAPHICS, I/O, AD/DA, FDC, HDC, SPEECH, the uniquer the better! Convert your extras to CASH. We buy SYSTEMS, peripherals too. Send FULL description and CHEAPEST asking PRICE to **S-100 BOARD BANK,** Mailorder Dept. C-2, Box 344, Olympia, WA 98507. 1-77

Z80 4MHZ/64K North Star Horizon; Dual 380K floppies, four I/O ports, twelve slots; perfect condition, $695. Call **513-426-5879.** 5-78

(130) S-100 COMPATIBLE, PERIPHERAL

5 Megabyte Hard Disk Drive Subsystem for all S-100 systems. Kit $450. **Digital Search, 803-877-9444.**

64K Dynamic RAM Board (Measurement Systems & Control DM6400). $100 or best offer. **914-462-7928 evenings.**

8K STATIC RAM $25. 2-Calcomp 142 8" w/Imsai case, $225. 2-Calcomp 140, w/case $200. 1-Adds Regent 60 CRT $225. Centronix 781 printer $85. **615-355-1061.** Jim Carroll, 304 Lexington Dr., Smyrna, TN 37167. 1-77

CompuPro Disk1 CSC $200; CPUZ $175; RAM17 $200; SSM IO8 (8 serial ports) $100; DR 256k RAM disk $100; 8" SSDD Shugart 801 will read hard or soft sector disks $125; Micromint Z8 Basic Board $100; All with manuals. **MAKE OFFER 405-324-2122.**

MORROW 26 Meg. hard disk w/S100 controller and software for numerous S100 computers, no reasonable offer refused. **Charlie 607-798-7111.** 5-77

National Instruments S100-GPIB interface new condition, includes MS-DOS handler and both BASICA & assembly language interface, fits Z100 or IBM Comp-S100 machine. **Ken Grant,** PO Box 19042, Portland, OR 97219. **503-292-9318 eve.**

SYNTECH OCTAGON 20 Meg. Winchester with S100 Controller $400. CompuPro RAM 21, $225. Tandon 848-2 ½ high 8 inch disk drives $50. Televideo 925 terminal $150. Call **Tony** after 6PM 312-349-9032. 5-77

(131) S-50 COMPATIBLE, PERIPHERAL

5 Megabyte Hard Disk Add-on for SS-30 or SS-50 from $450 with software and interface. **Digital Search, 803-877-9444.**

(132) HEATH COMPUTERS FOR SALE

H89 64K, 2 drive H77 $695; Z89-37 Soft controller like new $200; Z47 8" drives system $550; CPM, H-DOS, Business software. **Jim Trimble,** 6401 Old Trail Road, Ft. Wayne, IN 46809. **219-747-2879.** 6-78

H89 magnolia double density soft sector controller card #77316 with CPM 2.24 and QuickData DKFMDV3.DVD HDOS software, runs four 5" and four 8" drives with your H17 hard sector drives. Complete documentation $400 value, Sell first $225. Call **907-248-4078** after noon EST. **Herbert.**

H/Z 89A 48k for sale: $500 or best offer. Call **217-732-9641.** 6-79

Z-100, 2 Drives, 192K, green monitor, software, $1400 or best offer. **207-866-7075** evenings. **James H. Breece,** 2 University Place, Orono, ME 04473.

Z-100 Low-profile, 2 drives, 192K plus color ram. High-Res Color Monitor (ZVM-134). 300-baud modem. Complete Software: Z-DOS, MS-DOS 2, CP/M, Microsoft BASIC, Basic-80, Microsoft Pascal, Spellbinder Word Proc., dBase II, Zterm. All technical manuals and reference materials. A trusted & reliable friend. Mint condition. $950 firm. **Andy, 415-431-4688.**

★ ★ ★

ZP-150 PORTABLE

With 64K RAM and AC Adapter. Used only 2-3 hours. $690 (including FREE shipping in Cont. U.S.) Call **Terry at 916-265-4668** weekdays.

Zenith Z-100 dual 8/16 bit computer. Dual floppy, 5/8 MHz switchable speed, 765K RAM, 192K video. Send SASE for complete hardware and software list. **Frank P. Holderby,** 914 Sternbridge Dr., Concord, NC 28025.

(132A) HEATH SOFTWARE, PERIPHERAL

5 Megabyte add-on Hard Disk Subsystem for heath-89. Kit - $475. **Digital Search, 803-877-9444.**

H/Z-100 used software with master disks and complete documentation. All require ZDOS, some require ZBASIC. Multiplan-$50; Wordstar v3.21-$50; Peachtree Acctg.-3 modules-$70 each. All PP. Only one copy of each package. Call **813-923-2940.** 5-77

Needed: additional RAM, soft sector floppy controller for H/Z-89. **Michael Russell,** POB 2084CS, Pullman, WA 99165. **509-878-1714.**

(133) BURROUGHS SYSTEMS

BURROUGHS B92CS4 256KB mem. 120 cps console printer, 1.0MB mini disc, 18.8MB fixed disc drive, AP311 remote printer; three terminals with keyboards. Gone out of business. **W.E. Shelfen,** 904-787-9169, Rt. 12, Box 147, Leesburg, FL 32748. 5-77

HELP

Wanted To Buy: Burroughs Self Scan Displays and Nixies. Call **Jan Rondo Electronics Inc., 201-782-7814.** 4-77

(134) HEWLETT PACKARD COMPUTERS FOR SALE

9845 SYSTEM

H-P 9845 Desktop Computer. Complete with ALL software packs. Also Graphics, Mass Storage, and I/O ROMs, IEEE-488 & RS-232. Many extras and spare parts. Will sell for 15% of list price OR trade for MS-DOS PC/AT. **Jerry Adkins,** PO Box 4143, Huntsville, AL 35815. Or call & leave message @ 205-880-2250. 5-77

HP-110 Portable. Lotus 123, Memomaker, Communications software, and 272k RAM are built in. Excellent condition $1900. Call **402-291-0731** after 6 PM CST. **Larry D. Hutchison,** 2608 Ponderosa Drive, Omaha, NE 68123.

H.P. 7925S disk drive $3000 on maintenance. call **Scotty at 214-458-8881.** 6-80

Hewlett Packard HP-87A Computer. Almost new condition, only $400. **Televideo** Personal Terminal, only $200. Call **Bob Thomason, 502-683-9871.** 6-82

(134A) HEWLETT PACKARD COMPUTERS WANTED



$$$$ I Buy, Sell, & Trade Hewlett Packard computers. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

(134B) HEWLETT PACKARD SOFTWARE, PERIPH.

H-P 2621A Terminal - RS-232, 110-9600 Baud, 24x80 col., 2 pages Scrolling memory. $250. **Len, 212-777-4353.**

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HP-71B ACCOUNTING

ACCTGCAL is an accounting spreadsheet that will keep and maintain a simple set of books for any type of business. Entries can be made weekly or monthly by inputting data from a check register and a cash receipts journal or a trial balance.

Many different kinds of financial reports and analyses will be created quickly and be displayed on the screen or printer. This includes monthly cashflows, P&L statements, budgets, percentages and year-to-date summaries. The file can then be saved in mass storage and be regularily updated.

It is completely menu-driven and includes 2 examples and a detailed instruction manual. You can maintain numerous files for many businesses or departments. It even has a unique Learn Mode and a large Help File and runs very fast.

Because the HP-71B is a powerful, pocket-size, handheld computer, ACCTGCAL'S most outstanding feature is its portability. Business or professional men and department heads can carry all their financial data with them from home to office and on business trips. No other combination of hardware and software meets this unusual criteria.

Minimum hardware requirements are one memory module, a mass storage device, and an external monitor. While a printer is desirable, it is not required. Specify disc or tape. Send $80 to **Paul G. Delman and Associates,** 4900 N. Ocean Blvd., Ft. Lauderdale, FL 33308. Phone **305-943-0709.** 4-77

HP7970B Tape drive. New, was over $10,000; Sell for $300. Includes Async boards and 4-128K memory boards for HP, or trade for plotter. **303-972-4167, Tom Glover,** 12533 W. Grand Drive, Morrison, CO 80465.

Hewlett Packard portable (110) with portable disk drive (9114) and Think Jet Printer (22258). Includes all standard software and Time Manager. New condition $3000 or offer. HP Thermal printer for the 150 $200. **Ron Strine 717-243-4424,** 108 N. Hanover St., Carlisle, PA 17013.

Hewlett-Packard 150 Touchscreen PC, 512K ram, parallel port. Includes WP, DB, MSDOS, Turbo Pascal, disks. Excellent Condition, used little. Asking $3000. **518-891-5331 evenings.** 6-78

INKJET CARTRIDGES REFILLED ink does not bleed. $2.50 each exchange, $5 color. Box 2761, Knoxville, TN 37901. **615/525-6358.5-79**

STOCK MARKET programs for HP 86/87 computers. Powerful programs for selecting and evaluating stocks and commodities. Send $39.95 to **Lock Software,** Box 3163, Baltimore, MD 21228. Specify disk size. 9-79

(136) DATA GENERAL SYSTEMS

(138) DATA GENERAL, SOFTWARE PERIPH.

AOS-SP/Pascal, DG/Blast, GKS, CPM/86 stand alone, All like new, Make Offer. **305-587-7696, John Yale,** 3105 SW 12 Place, Ft. Lauderdale, FL 33312.

Disks: Front loading 5 meg. (DD15 ...like new, asking $25 each ... 23 disks; Plus racks. Call ...ael, **609-665-5800 days, 609-586-2010.**

(148) DEC SYSTEMS FOR SALE

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Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

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DEC 11/2 system RT-11 based. Includes 10Mb disk, printer and terminal. New in 1981 $2995. OBO. **615-728-9509.** 4-77

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DEC Liquidation CloseOut Prices!

Rainbow 100	$600
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LA100	$600
LA50	$175
DFO3AA Modem	$150
Floorstands	$50

(202) 944-5200

DEC PRO350

DEC PRO350, 512K, 10 MB HD, LA50 printer, mono monitor, floor stand, POS2.0, Assorted software. New, in carton. $3750. **219-874-2200.** 5-77

DEC PRO 350 slightly used. Best offer over $3000. 512 RAM, dual floppys, 10M hard disk, floating point, LA100 printer, amber monitor. **Bac-Data Medical Information Sys., Inc.,** 100 Campus Road, Totowa, NJ 07512. Tel. 201-890-1155. 5-78

DEC Pro350 system w/512k, 2 drives, 10M HD, Floating point adapter, mono monitor, cables. List $7245, Ask $3495. LA50 printer List $695, Ask $395. **714-627-7411 Ken.6-79**

DEC RAINBOW 100A under 100 hours use. 64K, keyboard, monitor, all manuals and software packages. LA50 printer. $1495. **201-247-6161 X239.** 5-77

Decmate II computer, double disk drives and keyboard, Ex + $1800; Letter quality printer LQP-02 is Ex + $1500; Monochrome monitor VR-201 $175; Entire system package for $3200 OBO. **V. Williams, Tel: 215-473-3133.**

LSI-11 KD11-F processor with EIS/FIS, 64Kb memory card, DLV11-F serial card, DRV11 parallel card, RXV11, REV11 with RX01 floppy disk drive, H780 (slave) power supply, VT52, LA36, make offer, **Doug 703-354-2556.** 6-78

MICROVAX-New systems with 190mb disk, reel-to-reel tape available and Decnet. Call for specifics. **301-490-3608.** 1-77

PDP11/23 SYSTEM 160kb, MMU, FPU, floppy, 10mb disk, multiple ports, terminals, printers, spares, DEC installation-$9000 complete. Ideal for laboratory/educational applications. **Phylan Incorporated,** 614-846-6248. 5-77

(149) DEC SYSTEMS WANTED

(150) DEC SOFTWARE, PERIPHERAL

For Sale: DEC KDF11-AA LSI-11/23 CPU board with 22 bit addressing and MMU $375; 2 ea. MXV11-AA multifunction board $150 each; Heath h-27 floppy disk controller and interface (RX01 emulating) $150. **David Dixon,** 3208 Jupiter Rd., Las Cruces, NM 88001. **505-522-0596.**

PDP 8E with DSD dual floppy $795. **CPM, 408-993-9011.**

RXO-1 Dual 8 inch floppies. Very Good Working condition. $300 or reasonable offer. Call **608-783-5585** after 5:00 CST. **Gary Baumgarten,** 615 12th Ave. North, Onalaska, WI 54650.

Rainbow 100 Software: C-Basic/86 $50; M-Basic/86 $50; Multi-Plan/86 $75; Condor 3 $175; Personal Pearl/86 $100; Peach Text 5000 for IBM/COMP $100. **Ron Strine 717-243-4424,** 108 N. Hanover St., Carlisle, PA 17013.

(154) IBM SYSTEMS FOR SALE

512K IBM PC with 2 DSDD floppies, IBM monochrome monitor, Keytronics 5150 keyboard, AST board with RS232, parallel port, clock/calendar. Excellent Condition $2100 & shipping. Call **Jim at 802-879-8657.** 6-78

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Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

Compac Portable with 10 mB hard disk, 256 kb, DOS, software, Excellent Condition $2100. Add $300 for Okidata ML83A Printer. 30 day warranty. **Paragon Computer Corporation 203-525-0389.** 4-77

Genuine IBM-PC, 256KB, dual half height floppys, printer display adapter, keytronics style keyboard all for $1250; NEC Amber monitor @ $139; Gemini 15X printer @ $115. Will sell separately. Call **Robert Victor, 201-691-0655.**

IBM Main Frame system 3 model 12, dual hard disk, line printers, two data entry consoles, and more. Excellent condition. Make offer. Call **504-394-7358.** 6-78

IBM Systems/23 - consists of 5322 (model 124) computer, 5242 printer, manuals, excellent condition, $4000 or best offer. **William Camp,** 22 Patch Rd., Rd.#3, Binghamton, NY 13901. **607-648-9396**



IBM 'Compatible, includes 640K Ram, 4.77-8MHz, Bios, 2 DSDD Floppies, Serial, Parallel, Clock, Color Graphics Card and Monitor

$799.00

THE BROKERAGE 619-728-9609

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System 23, perfect condition. Two computers, harddisk, printer, custom business software, all manuals. BASIC programmable. 2000 mile delivery and setup included. $6500. **804-293-2693.**

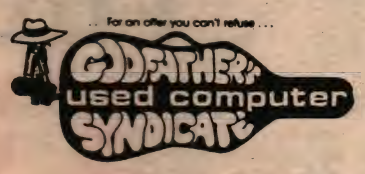
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System 23 with 5324 computer, 5242 printer, 5247 disk, $8500 or best offer. Days **305-676-2596,** Nites **777-1280 or 773-3417.** 4-77

System/23 with printer, documentation, and supplies. $3500 or best offer. **404-733-5144, John Hoverkamp,** Data/Mark Inc., POB 12213, Augusta, GA 30904.

(155) IBM SYSTEMS WANTED

IBM MODEL 5280 with two DSDD disk drives and would consider printer and programs. **505-461-2420.** 5-77



$$$$ I BUY, Sell & Trade IBM PC's. We may have a large quantity 'AT' clones coming shortly. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

Paying $5.00 per pound for scrap tantalum capacitors. Any amount, fast payment! Ship: **Sciuto,** 103 Saratoga St., Lawrence, Mass. 01842. 9-79

(156) IBM SOFTWARE PERIPHERAL

Documentation MSDOS 2.11 or WS' 3.3 $10 each; 3" binders $3 each; Time Life Intro to IBM or WS Magic $5 each; **Short Card** uses 896K with present software includes 256K and RAM-disk program $139. All orders + $3 UPS ($5 COD). **P & A Company,** 29 Tee-Ar Pl., Princeton, NJ 08540. 4-78

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REPLACE MS-DOS COPY, DELETE, RENAME with these fast, powerful utilities (DOS 2.0 or later). File lists with commas, optional confirmation querying, full directory tree copy/move/delete/flatten, access to hidden/system files, ASCII-mode copying. $15 + $1.95 s/h (MA residents add $.75 tax), MC/VISA OK. **Pocumtuck Valley Software,** PO Box 156-B, South Deerfield, MA 01373. 5-77

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NO JOKE not a come-on. National brand DS/DD lifetime guarantee disks, $12.75 per box of ten. Say the word and we will fill the disks with our best public domain and freeware programs. Add $1.75 per order for postage and handling. **A.M. Baker,** 7907 Prairie Creek Way, Sacramento, CA 95823. 5-78

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IBM PUBLIC DOMAIN

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Data management system for most State Lotto drawings. provides detailed statistics reports for determining next Lotto drawing probabilities. IBM/Compatibles. $39.95. **Computer Solutions,** 2044 W. State St., Fremont, OH 43420. 4-77

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Steal My IBM Software & Hardware. Everex 60 megabyte tape drive in external cabinet, with power supply & 4 cartridges, $400; dBASE-III Plus $300; RBASE 5000 with Clout & Extended Report Writer, $300; ChartMaster, SignMaster, & Diagram-Master, each $125 or all three for $300. Call for full information and other items for sale. **Ed Schneider,** 28 Orchid Road, Levittown, NY 11756. **516-796-8825** 10AM - 9OM EST.

Top View by IBM, Windowing for the PC list $100 + +, Closeout price $45 includes S/H; IBM **PC-Jr BASIC** book & Cartridge $61 includes S/H. **Computer Reset,** PO Box 461782, Garland, TX 75046. **214-276-8072.** 6-78

(166) MISC. (HARDWARE & SOFTWARE)

★ ★ ★

Compaq Monitor. Like new amber Deskpro monitor, $125 PP. CCR. **Steve Ringwood,** 6085 Skyline Blvd., Oakland, CA 94611-1039. 415-271-3209 days. 5-78

Great Tax Write-Off

Nonprofit organization accepts tax deductible donations. Computers MSDOS/CPM, Hard-Disk/Floppy. **305-968-8381 or 212-777-3891.**

HELP

Wanted To Buy: Burroughs Self Scan Displays and Nixies. Call **Jan Rondo Electronics Inc., 201-782-7814.** 4-77

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Having Problems with 1-2-3 or DBaseIII? We write user friendly menu driven applications customized to your specific requirements. For a FREE quote send us your requirements and a stamped self addressed return envelope. Our prices are very reasonable! **Systems Use Made Simple, Inc.,** 139 Decker Pond Road, Andover, NJ 07821. 5-77

Pied Piper-complete system. Kaypro compatible with WordStar, DBase II, PerfectCalc, Two 880-K disk drives, built-in modem monitor. Loads of software. $700. Call **609-882-5710.** 4-77

(172) DISK DRIVES

8" Shugart MOD SA 860-1 double sided drives in unused condition with full 1 year warranty. These drives replace old MOD 800, 801, 850, 851, Require no AC and are direct drive. Capacity is 1.6 MB, Track to track access time is 3MS. **CEC,** PO Box 1965, Burlingame, CA 94010. **415-342-4058.** 5-90

45 Meg Corvus Omni Drive $2100
603-783-4708

51.9 Meg. Winchester. High-perf ST506 Micropolis 1304. 30ms average seek. Formatted capacity over 40meg. Tested and certified $490. With 6-month warranty $545. **714-968-7119, Mike Randall,** 18951 Crimson Circle, Huntington Beach, CA 92646.

8" DSDD ½ Height Shugart Mod Sa 860-1 unused condition with full one year warranty. Price $279. These drives have track to track access times of 3MS. They will work as replacements for Shugart 800, 801, 850, 851. They require no AC to operate. **CEC,** 1745 Adrian Rd., Burlingame, CA 94010. **800-228-3411.**

8" SSDD ½ Height Shugart Mod SA 810-1 unused condition with full one year warranty. Price $269. These drives have track to track access times of 3MS. They will replace Shugart Mod 800, 801, or any other 8" SSDD drives, however, they require no AC to operate. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.6-79!**

8" SSSD Drives. $75. Can be used a Double Density. Removed from operational equipment. Shugart 8" 50 Hz, 220V conversin kits also available. **Digital Search, 803-877-9444.**

8" Shugart MOD SA 860-1 double sided drives in unused condition with full 1 year warranty. These drives replace old MOD 800, 801, 850, 851, Require no AC and are direct drive. Capacity is 1.6 MB, Track to track access time is 3MS. **CEC,** PO Box 1965, Burlingame, CA 94010. **415-342-4058.**

Alignment disks 5¼ 48TPI SS $15; 5¼ 96TPI SS $15; 5¼ 96TPI DS $19.95. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.**

Cabinet for two 8 inch wide style Shugart drives, fan, all AC and DC wiring with power supply $100. **Cascade Electronics Inc.,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

★ ★ ★

Comp-Used

All used products over $100. Buy/sell through nationwide listing service. **NO CHARGE** for buying direct from owner. **NO RISK** for sellers - 6% commission when successful. Open 24 hours if you have a touchtone phone. **203-762-8677.** 6-79

DSDD Disks 59¢



Major Manufacturer - Call for Details

Complete with sleeves and labels. Hub rings, 48 t.p.i., High Quality. 100% Satisfaction Guaranteed. 1000 for .59 each (add $40 shipping), 200 for .63 each (add $8 shipping), 100 for .65 each (add $8 shipping). For more information on this and other products, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

DriveTec D-320 2.6Mb latest model, use in Robie, etc. Under 1 hour usage, guaranteed. $350 single $600 pair. 10 new preformatted disk $95 with drives, $125 without. Call **502-651-9050** evenings or write **David Borders,** PO 668, Glasgow, KY 42141.

HD Drives: used, checked, ST506 or ST406 Equiv. sm $65; Shugart 851 DSDD 8" Floppy like new $130; Mitusbishi M4853 5" floppy DSQD Excellent cond. $45; Mitsubishi M2896-63 8" floppy, ½ ht. DSDD excellent $130; Switch power supply 100 watt, new $25. 5v@8A, 24V@½a + 12V@2A, -12V@2A, Will power SB computer, hard & floppy, and controller. Terms: FOB Sullivan, NH. MC/VISA, COD. **AJ RAM Associates, Inc., 603-847-9797,** Box 94, Sullivan, NH 03445. 5-77

Innovex 200 8" SSSD Drives, excellent quality. Can be used double density. 4 for $100. Complete, but requires alignment or adjustment. **Digital Search, 803-877-9444.**

Alignment disks 5¼ 48TPI SS $15; 5¼ 96TPI SS $15; 5¼ 96TPI DS $19.95. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.**

MPI 52s & 92S Closeout $40 working, $15 non-working. Xidex DS/DD $10 for 10 ea. Add $5 S/H per order. **Nuevo Electronics Corporation,** POB 209, Richmond, TX 77469. **713-341-6001.**

Micro-floppy 3½" drives. 500k bytes Shugart SA300 w/warranty $90 each. NEC FD 1035, DSDD (1 meg) $175 each. Same interface as 5½" drives. **Digital Search, 803-877-9444.**

Morrow 8 in. disk drive, complete w/case and power supply $125. **Richard Seale, 303-449-4897/443-4681.** 6-78

SA850 disk Drive removed from service 90 day guarantee $99; SA800-2 Disk Drive removed from service 90 day guarantee $59. **Cascade Electronics Inc.,** route 1, Box 8, Randolph, MN 55065.

SASI Winchester controller $75 each; 2/$140. SMS Model FWD 5001. Simple host adaptor required. Runs Shugart and Quantum drives. Write: **William R. Wood,** 4863 S. Livonia Rd., Livonia, NY 14487 or call **716-346-3304** evenings. 6-78

SHUGART SA-801 floppy disk drive. Reconditioned and re-aligned $55. **Harry Beerman,** 2510 Wysstead Drive, Fort Wayne, In 46819. 219-639-3035. 5-77

★ ★ ★

SPECIAL SALE

Shugart SA800-2 $59; Shugart SA850 $99; TEC FB-501 5¼" ½ht. SS/DD $49; MPI 52S 5¼" DS/DD full ht. $55; Sixty day warranty-shipping extra. Documentation included. **LDL Electronics,** 13392 158 St., N. Jupiter, FL 33478. **305-747-7384.** See showcase ad for drive servicing. 6-80

ST506 Winchester Controller Kit. $200. Faster than Western Digital WD1002 Controllers. SA1002 8" hard disk controller also available. **Digital Search, 803-877-9444.**

Shugart SA800-2 2 like new drives in cabinet w/PS and cables all for $400; Star Modem like new for $150. I'll pay shipping. **Wasserman,** 112-01 Northern Blvd., Corona, NY 11368.

Two Seimens FD-100-8 disk drives, power supply, case, and Versafloppy-II interface card. $400 or best offer. **914-462-7928 evenings.**

Two Tandon TM-848-2 DSDD 8 inch disk drive. In excellent condition $200.00 each also 8 inch vertical case without P/S $20.00 two Tandon SSDD, drives in double vertical case with power supply $150. Ask for **Scott, 412-489-4820.** 5-77

WD1002-SHD SASI

Hd Controller $125. Call **301-468-6652** evenings, **S. Tooley,** 4804 Ertter Dr., Rockville, MD 20852.

Winchester Drive Sale. Shugart SA1002. 8" - 5 megabytes, 2 for $100, controller kit $200. **Digital Search, 803-877-9444.**

8" SSDD ½ Height Shugart Mod SA-810-1 unused condition with full one year warranty. Price $269. These drives have track to track access times of 3MS. They will replace Shugart Mod 800, 801, or any other 8" SSDD drives, however, they require no AC to operate. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.6-79!**

Alignment disks 5¼ 48TPI SS $15; 5¼ 96TPI SS $15; 5¼ 96TPI DS $19.95. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.**

8" DSDD ½ Height Shugart Mod Sa 860-1 unused condition with full one year warranty. Price $279. These drives have track to track access times of 3MS. They will work as replacements for Shugart 800, 801, 850, 851. They require no AC to operate. **CEC,** 1745 Adrian Rd., Burlingame, CA 94010. **800-228-3411.**

8" SSDD ½ Height Shugart Mod SA 810-1 unused condition with full one year warranty. Price $269. These drives have track to track access times of 3MS. They will replace Shugart Mod 800, 801, or any other 8" SSDD drives, however, they require no AC to operate. **CEC,** 1745 Adrian Rd., Unit 1, Burlingame, CA 94010. **800-228-3411.6-79!**

(174) PRINTERS

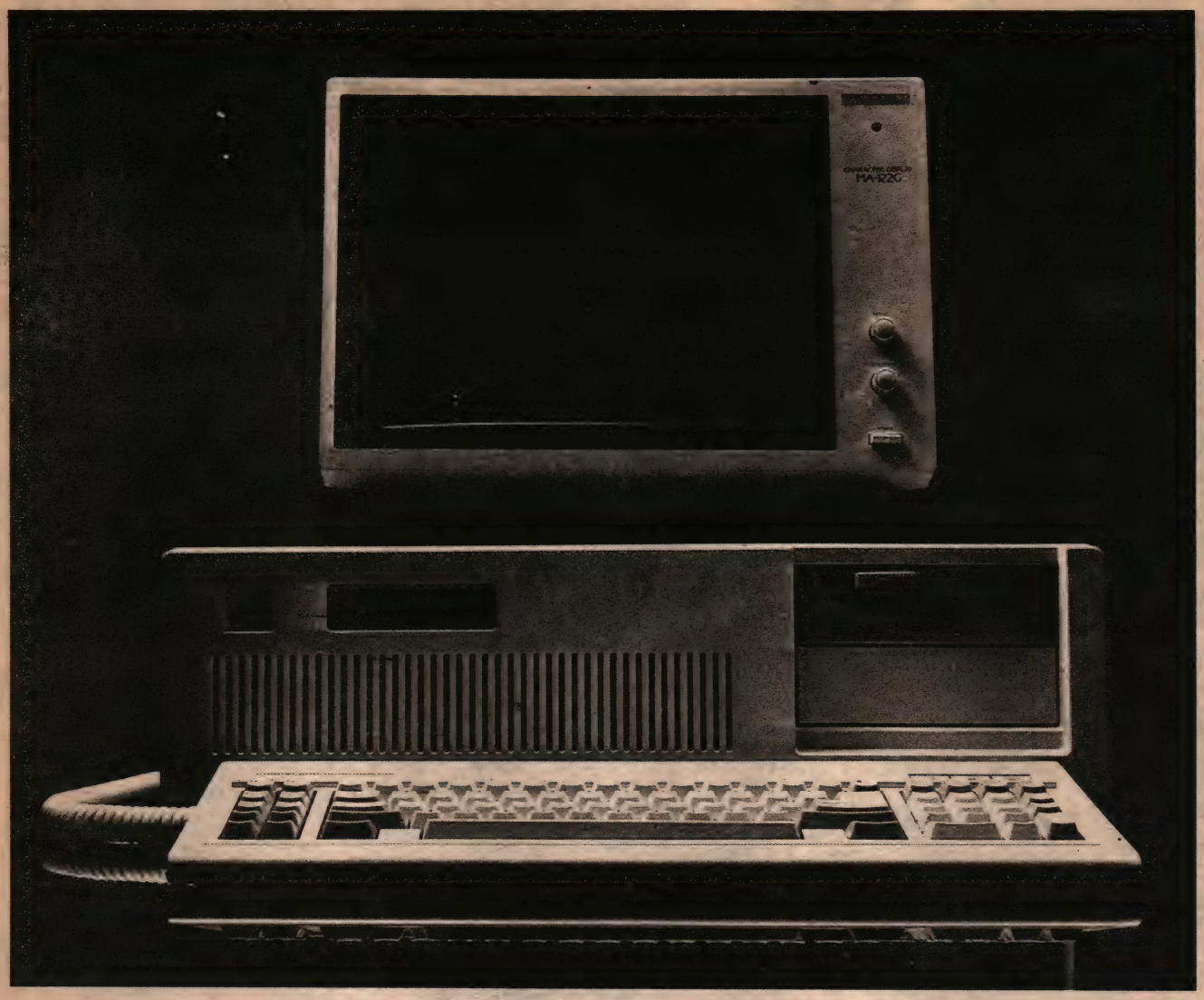
20 CPS Daisywheel Letter Quality Printer With Automatic Cut Sheetfeeder



$369

Axiom DX 2000 13" letter quality printer with 75 sheet automatic sheetfeeder. Also available, Axiom DX 2500 15" 25 CPS printer with sheetfeeder $419. For more information on these and other super bargains, see ad index for **BCE** full page display ads in red. **BCE 1-800-545-7447.**

45cps Daisywheel. Olivetti DY450. Uses Diablo software commands. Serial, IBM compatible, 3k buffer, friction feed, wide



THE MOST AFFORDABLE.

IBM AT® COMPATIBILITY

40% FASTER QUANTUM™ AT TURBO

with

20MB HARD DISK

and

FULL ONE YEAR WARRANTY

$1995.00

call

(714) 259-1127

for

QUANTITY DISCOUNTS



QUANTUM XT TURBO $899.00

- ☐ 8088-2 Processor (CPU BOARD, MADE IN USA)
- ☐ 4.77-8 MHz speed switch selectable
- ☐ 256K expandable up to 1MB on board
- ☐ Two-360K Floppy Drives
- ☐ Mono or Color Graphics Card
- ☐ Hi-Res Mono Monitor
- ☐ Parallel Printer Port
- ☐ AT style keyboard
- ☐ Full (1) One Year Warranty

- ☐ 80286-8 Processor (CPU BOARD MADE IN USA)
- ☐ 6-8 MHz speed switch selectable
- ☐ 512K RAM expandable up to 2MB on board
- ☐ 1.2 MB Floppy
- ☐ 20 MB Hard Disk
- ☐ Parallel Printer Port on board
- ☐ 200 W. Power Supply
- ☐ AT style keyboard
- ☐ Fully assembled, tested and 48 hour burn-in.

QUANTUM XT $799.00

- ☐ 8088 Processor
- ☐ 256K expandable up to 640K on board
- ☐ Two 360K Floppy Drives
- ☐ Mono or Color Graphics Card
- ☐ Hi-Res Mono monitor
- ☐ Parallel Printer Port
- ☐ AT style keyboard
- ☐ Full (1) One Year Warranty

☐ 20 MB Hard Disk Sub System (Controller & Cable)	$ 465.00
☐ 20 MB Hard Disk (40MS) For AT	$ 650.00
☐ 33 MB Hard Disk Sub System (Controller & Cable)	$ 695.00
☐ 33 MB Hard Disk (40MS) For AT	$ 750.00
☐ 68 MB Hard Disk (25MB Voice Coil)	$1499.00
☐ 60 MB Tape Streamer Back Up	$ 899.00
☐ Mono or Color Graphics Card	$ 110.00
☐ 14" TTL Mono Monitor	$ 149.00
☐ 12" TTL Mono Monitor	$ 99.00

AFTON COMPUTER INC.

24825 CALLE EL TORO GRANDE • EL TORO, CALIFORNIA 92630 • TELEPHONE (714) 259-1127

carriage. See as Businessland model 450. Unused in factory box $695 shipped pp COD. **Kelly Hancock, 503-285-8876.**

★ ★ ★

64K PRINT BUFFERS internal parallel interface for **EPSON** series printer. **$55** certified ck/mo, includes shipping. **Brian Blasjo,** 5391 Sunnyside, Riverside, CA 92504. **714-688-7933.**

Brother HR-35 daisywheel with sheetfeeder model CF 50. parallel. Like new. $750 shipped pp COD. **Kelly Hancock, 503-285-8876.**

C.ITOH Dot Matrix Printer, 8510B, like new $75. Also for the **QUME multi-strike IV** new ribbon and 5 different printer wheels, $15. Send to — **Dr. Smith,** MEDDAC, APO, NY 09105.

Comrex CR-IIe Only $339!!! List $599!! 18 CPS Daisywheel Parallel. Sheet feeder only $139! Both new in factory carton. Add 3% shipping. **606-255-2298, Datalex,** 1389 Alexandria #1, Lexington, KY 40504. 2-77.

Custom WordStar instructions for Epson, Star/Gemini, Panasonic, Citizen, BMC, Legend, Olympia, Okidata, Prowriter printers; get boldface, continuous underlining, super/subscripts, compressed, enlarged characters and more. **$10,** specify computer and WordStar version. **LAI,** PO Box 13118, Minneapolis, MN 55414. 6-79

Daisywheel 45 CPS Diablo 1610 with PC interface $585. Also tractor, printwheels, ribbons, manuals. Works perfect. **507-289-0400.** 6-78

Dataproducts M200 Printer 340 CPS dot matrix, Centronics input, $1000. Teletype AP200 Printer (Same as DP M200) RS-232 input $1000. **Len, 212-777-4353.**

Diablo P-11 dot matrix printer, (list $649) unused $200 each. Full warranty. 100 CPS parallel interface, excellent quality. **Digital Search, 803-877-9444.**

Diablo Printer Accessories: Forms Tractors for 630 & Hytype II Printers; Uni-Directional $95; Bi-Directional $195 (unused); $165 (used); Sheet Feeder, mechanical $425 (unused); $325 (used); Dual Bin sheet feeder, automatic, processor controlled, for Diablo 630 $895. **Expansion Products Service Company,** PO Box 4217, Mountain View, CA 94040. **415-965-7222.**

Diablo or Qume printer power supply kit. $75. New QUME pin feed platens $40. **Digital Search, 803-877-9444.**

Epson MX-100 printer with 16K microbuffer. Very good condition $350 & shipping. **Call Jim at 802-879-8657.** 6-78

Epson MX-80 with Grafrax ROM, parallel and serial (RS232) interfaces. $200 or best offer. **914-462-7928 evenings.**

For Sale: have an I/O IBM Selectric typewriterr that your can't interface to your computer? I have just the interface you need $105. Call **608-783-5341** or write **Ron's Electronics,** N5009 Sunset Vista, Onalaska, WI 54650, for more details.

Four Diablo 1620 printers $550 each. One with sheet feeder $650. Call **Scotty 214-458-8881.** 6-80

Hewlett Packard ThinkJet printer, hardly used with paper, 180 CPS, Centronics, for HP, IBM, for Apple Computer $250. **602-993-3276, Ed Crawford,** 11016 N. Biltmore Dr., #3238, Phoenix, AZ 85029.5-77

IBM 15" Selectric Printer/typewriter, standard ASCII code, serial/parallel. All units rebuilt $369. **Ron's Electronics,** N5009 Sunset Vista, Onalaska, WI 54650.

IBM Color printer. 200 + CPS draft mode, 45 CPS NLQ mode. Great workhorse printer. List for $1995. Sell for $600. Perfect Condition. Call evenings **405-529-2715.** 5-77

Imagewriter I
$295
603-783-4708

Interface Kit for Diablo or Qume printers RS232 or Parallel. $95. Parts for Qume 1 & 3 and Diablo Hytype I: Repairs, cases, power supplies. **Digital Search, 803-877-9444.**

Keyboard $89.95 for **Brother15/Comriter/Dynax15**- convert your printer into a typewrite with correction capability, more features, better keys than most typewriters. $5 shipping. VISA/MC add 4%. **Kyntek Marketing,** PO Box 13070, Minneapolis, MN 55414. **612-379-1020.** 6-79

For an offer you can't refuse . . .
Godfather's used computer Syndicate

$$$$ I Buy, Sell & Trade Printers. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.



I Bought an NEC PC-PR103A Dot-Matrix Printer from a MAJOR close-out company. I LOVE IT. It Works GREAT With my IBM PC in character mode! Only thing is, it came with no cable wiring diagram or software to set the fonts and functions!

$14.95 + $2 shipping and handling gets you a menu driven printer set-up program!

This program will let you pick: ELITE; fast PICA; COMPRESSED; PROPORTIONAL; NLQ Quiet mode; Fast mode; Wide mode; bold printing mode; Set Left and Right margin; Set to 6 or 8 lines per inch; and run a one line Printer Test! All from one easy, fast, BUG-FREE menu.

I said "Why bother to write this program, when you can buy a copy for $14.95?"

It also includes a simple wiring diagram helping you to hook up your printer to an IBM PC parallel port. Most disk formats and sizes supported. For PC-DOS, MS-DOS and most CP/M computers. Send your name address **and phone number,** computer name, model, disk format, and check or money order for $14.95 + $2 S/H to: **MOMS SOFTWARE, 32 Blanche Ave., New Windsor, NY 12550** OR call **914-565-2412** to ask about versions for **other Dot-Matrix printers.**

For an offer you can't refuse . . .
Godfather's used computer Syndicate

$$$$ Toshiba 1350 for $899 like new. **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

Mannesman-Tally model MT140/OEM TO425 brand new in box, 132 characters, 160 CPS, with tractor feed $300. With NLQ option $350. Call **Rick,** after 6:00 pm CST. **615-832-8420.** 4-77

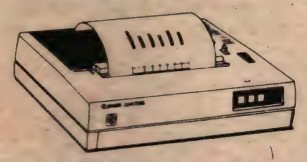
Mannesmann Tally Spirit 80 parallel printer w/4 ribbons $170 (new), IEEE488 board for Okidata 92/93 printer $50. **Richard Seale, 303-449-4897/443-4681.** 6-78

Multi-Strike IV ribbons fits Qume 9, 10, 11, Abati & Apple LQ. DEC LQP-02 $36/dozen. **Len, 212-777-4353.**

NEC 3510 35 CPS daisywheel printer. Good condition. Only $300. Call Evenings **405-529-2715.** 5-78

Panasonic Printers, KX-1090, $115, and KX-1091, $165. Both are 9 months young and in perfect condition. Add $10 for shipping. "Ape-Face" parallel interface for Atari's for $20 with purchase of printer ($50 otherwise). **Gary Smith, 615-885-3831,** after 6; no collect calls.

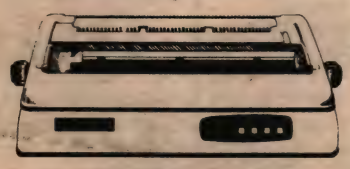
Printer Liquidation



Canon Color Ink Jet Printer
$199

Canon PJ-1080A Ink Jet Printer - 37 cps, 640 dots per line, 7 striking colors, centronics parallel interface. Can be used for overhead projections. Works with all standard IBM graphics packages. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

Printer Liquidation!



40 CPS Wide Carriage
Daisywheel Letter Quality Printer
$349

Manufactured by TEC, Commodore 6400, Diablo 630 compatible, 40 CPS, Centronics Parallel interface, 2K buffer, bi-directional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

Printer Liquidation!



NEC Dot Matrix Printer
$139

NEC PC-8027A -- Transportable, complete graphics capabilities for IBM, Apple, etc. 105 CPS. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

QUME Sprint 3/5 Rutishauser RS903 sheet feeder $210. RT203 bi-directional tractor $120. **Microsound,** Box 1153, Loomis, CA 95650. **916-885-1854.** 5-77

Reconditioned Printer - ribbons wide IBM, CDC, Data Products, many others. cartridges, assorted colors, etc. **214-247-1097, Hi-Tech Supplies,** 2081 Hutton Drive #307, Carrollton, TX 75006.

Seikosha SP-1000 Series printers with tractor and cut-sheet feeders. Compare with dot-matrix printers at twice the cost. Available with most popular interfaces built-in. **R.L. Bell & Co.,** PO Box 2152, Decatur, IL 62526-0152.

Selectric Interface - Easily interface input/output selectrics - 731, 735, 745, Dura, Cope, Remington, Datel, etc. - serial/parallel, correspondence/BCD, Board/Eprom/Manual $35. **M. Bickerton,** 47 Birchwood Court, Tinton Falls, NJ 07724. **201-842-3762.**

Selectric Typewriter 745 new, complete with interface for centronics parallel or serial to 9600-baud. Supplied with type-balls, forms tractor, ribbon and complete interface instructions/schematics $345; Ribbons 6/$3 when purchased with typewriter. **M. Bickerton,** 47 Birchwood Court, Tinton Falls, NJ 07724. **201-842-3762.**

Silver Reed EXP400/WordStar Input Correct codes! 13 page, Easy-to-Understand Installation Manual! send check or moneyorder for $9.95 (includes postage). **Word Association,** Box 22563, Lk. Buena Vista, FL 32830.

TTX1014 Cut sheet feeders, $69.95. Fits Swintec, Nakajima Olympia Electronic R.O. **415-829-4976.** 3-83

Teletype Mod 40/132 RS 232 Interface w/Sound Enclosure 90 day guarantee.. $1995; **QUME Wide Track.. $195. CPM 408-993-9011.**

Texas inst. 810 RO Basic printer 150 cps, 1K buffer, RS-232 $450. **Len, 212-777-4353.**

Tractor Feed for Microline 80 or Microline 82. Like new in box $35. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

WANTED IBM Selectric 50 or 60 printer with TRS-80 III interface. **408-335-3209.** 3-77

Wanted: nine new replacement print pins for a Centronics 704 printer, or used print head if it's pins are okay and price is low. Also want a 15 CPI "Fence" for 704. **616-723-7859, Schneider,** 8025 Coates Highway, Manistee, MI 49660.

Xerox 800 Diablo 33 CPS Metal Daisy Wheel Dual interfaces $600 postpaid. **Nick Jones,** 2 West Winter Street, Delaware, Ohio 43015. **614-369-6812** (days). 6-78

Diablo 630...Letter Qlty. printers...like new, perfect condition from $875; 630 API (serial & parallel) $1095; 630 KSR (with keyboard)..$1395; Diablo 1650 KSR, metal wheel, 45 Cps $895; diablo 1610 RO, 48 Cps, Super Value @ $475; Model 620, 21 Cps, $425. Full warranty. Superior Equipment at excellent prices! **Expansion Products Service Company,** (Certified Diablo Service Center), Contact us for full details & pricing: PO Box 4217, Mountain View, CA 94040. **415-965-7222.**

Diablo Model 1345A daisy wheel printer, HyType II, with power supply and cable, make offer. **Doug 703-354-2556.** 6-78

Typewriter/Printer $75; Taken off line. Similar to ones offered in CPU's ad. These make great letter quality typewriter/printers. We supply detailed instructions and have a complete interface (with serial and parallel) for $105. **Ron's Electronics,** N5009 Sunset Vista, Onalaska, WI 54650. **608-783-5341.**

(178) TAPE DRIVES

APPLE 9-TRACK TAPE DRIVES — Read/ write standard ½-inch, 800 BPI, IBM compatible tapes on an Apple. Exchange data with minis and mainframes. Backup floppies and hard disks. $1000-$2100. **Electrovalue,** Box 376-C, Morris Plains, NJ 07950. 201-267-1117. 8-78

Cipher Microstreamer tape drives 1600 bpi Model F880 (unused). Sale or trade. **(817)566-2196.** 1405 Angelina, Denton, TX 76205. 5-77

Genuine 3M mini data cartridges DC 1000 high density. Sealed. Like new. $8.50 each. **Kelly Hancock, 503-285-8876.**

HP7970B Tape drive. New, was over $10,000; Sell for $300. Includes Async boards and 4-128K memory boards for HP, or trade for plotter. **303-972-4167, Tom Glover,** 12533 W. Grand Drive, Morrison, CO 80465.

IBM-PC 9-TRACK TAPE DRIVES
Exchange data with minis and mainframes. Industry standard 800 BPI, 9-track tape drives. Complete hardware/software packages from $1200 to $2100. Write/call for 8 page brochure. **Electrovalue Industrial Inc.,** Box 376-CP, Morris Plains, NJ 07950. 201-267-1117, M-F, 10-5.

½" Mag Tape drives. Like new and used. Wanco 7", 9 track $450 each. **Digital Search, 803-877-9444.**

(180) CRTS, MONITORS

12" Hi-Res monochrome greem monitors. Distributers surplus original cost $149, Pay ONLY $69 plus shipping. **509-525-2580.6-79**

12" Langley Sinclair green screen replacement CRT's, **screen only,** like new, $29. 603-783-4708.

Green Monitors BMC 12" green like new $85 each. Call **Kevin Smith at 716-487-1563.5-78**

For an offer you can't refuse . . .
Godfather's used computer Syndicate

$$$$ Super Hi-Res RGB Monitors—See our full page ad this issue for your choice of a super deal on a like new monitor!!! **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

NEW $15.00!
12" B/W, No frames 110VAC, Schematics. **Comp. Video Sync Sunn,** 588 Douglas, Altamonte, FL 32714. **305-774-9636.**

(181) CRT TERMINALS

Datamedia 3052 CRT terminal. Emulates VT52. In good condition with documentation. $150 or offer includes UPS. **Jon Radel,** 110 Sydnor Dr., Leesburg, VA 22075. **703-777-6495.**

For Sale: Televideo multiuser package complete with Turbodos 1.41 and software. $38.50 negotiable. 1-6 user TS 806-20 20mb hard drive; 2-TS 800A's; Turbodos 1.41' Wordstar Professional; Supercal 2. Call **Dave Sander at 612-379-7066 or 612-427-7531.** 5-77

Freedom 50 terminal, excellent condition $300 & shipping. Call **Jim at 802-879-8657.** 6-78

(182) TERMINALS

Adds Viewpoint Ergo with original 90-day warranty. $375. **Digital Search, 803-877-9444.**

Beehive CRT's and parts for sale, rent or lease. Repair exchanges also Cado beehives and cromemco 3102's. Superbee II's, B100, B300/400, B500/550, Microbee, DMIS DM20/30, DM83, DM3270, DM standards, ATL083, ATL3270, ATL004, and more. Call **Mark (916) 677-0355** 10-78

Beehive terminal. Level VI. Never used. $450. **Sandy 305-427-2298.**

For an offer you can't refuse . . .
Godfather's used computer Syndicate

$$$$ Super Televideo 950 Terminals like new $299!!! With 90 day warranty!! **Godfather's Used Computer Syndicate,** PO Box 3037, 1154 W. SR 436, Forest City, FL 32714. **305-774-1111.** 6-82.

LIKE NEW ASCII amber 15" RS232C ports swivel base, 24x80 w/man. original cartons $150 each. **Kim 205-855-4600.** 6-78

Several poor college students in desperate need of terminals. Would appreciate donation of few terminals with RS232 ports, and manuals. Please contact: **Dennis Teague,** 4302 Thornleigh Drive, Indianapolis, IN 46226.

Televideo 925's. Perfect condition $140 each or $250 for both. Call evenings **405-529-2715.** 5-77

Terminal Hazeltine 1500 $300. **213-375-7784** 6-79

Terminals, Televideo 925E, Tandy DT-100 $495 each. **414-856-6211, A.F. Schmitz,** Forestville, WI 54213.

WYSE WY50 terminal excellent condition, one only $275 or trade for Data General D-200 Terminal. **Rampart Rental Center,** 1590 York Road, Colorado Springs, CO 80918.

Wanted: Computer Devices (1205) ASR terminal with integral minicassette (need four). **David Blair,** PO Box 353, Fort Mill, SC 29715. 6-79

Hazeltime 1500 video, DEC LA36 printing, $175 or best offer. **Anthony Nowakowski, 716-773-3821.** 5-78

Heath H19 with Super-19 ROM (enhancements and 38, 400 bps), non-glare screen $300 or best offer. **914-462-7928 evenings.**

(183) MULTIBUS BOARDS

6800 Multibus boards also ½ and 1 Meg. memory boards $7000 or BO. for entire lot. **603-880-6830 evenings.** 5-77

For Sale: Comptuer Products Corp. Rimfire 44 Multibus tape and disk controller board, new (list $2995) sell $1200. **203-755-1180.** 6-79.

XT Clone System two floppy drives 640 K ram installed color card Serial Parallel RTC game port at keyboard 150 watts PS . . . **$750.00**
XT Clone with 20 MEG Hard Drive **$1200.00**
XT Clone parts . . . . . **Please Call**
Hard Disk Controller for Z80 Systems any size drive with software **$325.00**
SA850 Disk Drive **$99.00**
Keyboard by Microswitch 113 keys 8 bit ASCII output with case **$40.00**

Cascade Electronics

Route 1 Box 8
Randolph MN 55065
507-645-7997

Free Shipping On Prepaid Order

COD add $3 Credit Card add 5% MN add 6%

For Sale; Interlan NI3010 Multibus Ethernet Board, new (list $1390), sell $800. **203-755-1180.** 6-79.

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Macintosh Motherboards for sale, can upgrade to 512k, unmodified, way below cost of swap for Macintosh power board or Lisa without digital boards. **Burk Andree,** 600 Walmer Road, Saskatoon, SASK S7L 0E2. 5-77

Multi-Bus system Includes: Electronic Solutions 9 slot Multi-Cage Microbar systems DBC8086 CPU card, Microbar Systems DBR50 256K memory card, Central Data Corp quad serial interface, never Used $425. **Len, 212-777-4353.**

PDS dual processor Intel Development system; much software $1700; MDS-210 Intel Development systems with DD-disk and terminals w/software $1000; Other Multibus boards available. **312-255-5092.** Ask for **Testek.** 5-77

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PCjr 640K total with clock/cal, printer port, ram disk $299 New; US.S Robotics Courier 2400 Baud Modem $379 New. SASE for info. **Paul Rau Consulting,** 260 N. Lincoln Way, Dept. CS, Galt, CA 95632. 5-78

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Disk Drive Repair at low fixed rates for most 8", 5¼", PC's, portables, Apples, compatibles....5¼" prices = <$25 S.S. mechanical repair (add $5 for D.S.) = <$35 FDD Printed circuit board repair including mechanical repairs. parts are extra/installed w/consent. 60 day warrenty, 3 day average turn around. expedition service available. Call **ISR 512-467-7085** for more information. 4-80

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(186) MODEMS

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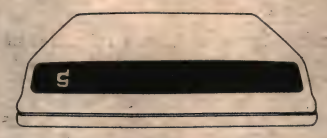
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Hayes 1200 modem
$250
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NATIONWIDE BULLETIN BOARDS 1000+ listed alphabetically by state, area code, and computer type. Send $4.50 to **R. Miller,** 5539 Whistlewood Ln., Charlotte, NC 28208. 5-78

PCjr 640k total with clock/cal, printer port, RAM disk $299 new. U.S. Robotics Courier, 2400 baud modem $379 new. SASE for info. **Paul Rau Consulting,** 260 N. Lincoln Way, Dept. CS, Galt, CA 95632. 5-78

RACAL-VADIC 1250 Bell 202. 1200 and 300 baud. manual, power supply, and line cord. $50 shipped pp COD. **Kelly Hancock, 503-285-8876.**

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(187) WORD PROCESSING

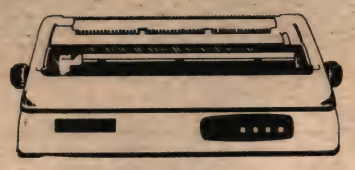


Leading Edge Word Processor $39 For IBM and All Compatible Systems

"This program is a gem, and at $250, it's also a gem of a bargain!" --PC Magazine, January 28, 1986. Software Digest, an independent publication which accepts no advertising, reviewed and rated 25 word processing programs in its January 1986 issue. These included WordPerfect, Volkswriter Deluxe, WordStar 2000 Plus and Microsoft Word. Software Digest concluded: "the Leading Edge Word Processor offers the best balance of user-friendliness, performance and features of all the programs tested." Basic & Simple Version $39. With Spelling checker and merge/Print Options $49. 100% Satisfaction Guaranteed! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE, 1-800-545-7447.**

Lanier LTE-3D Word Processor. L-1600 daisy wheel printer with forms tractor and acoustical cover. Includes software; Repage, List/Merge, Record Manager, Building Blocks. Asking $3000. Call **Tom Williams, 904-795-2362.** 6-79

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40 CPS Wide Carriage Daisywheel Letter Quality Printer $349

Manufactured by TEC, Commodore 6400, Diablo 630 compatible, 40 CPS, Centronics Parallel interface, 2K buffer, bi-directional, optional sheetfeeder and tractor feed. For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

WORDSTAR COMMANDS on thirty-two 3x5 Roladex(tm) cards. Indexed with command summary & correct syntax. $12.95 (PP & MBG). **Brian Lewis,** 6423 Caracara St., Sarasota, FL 34241. 5-77

(188) MISC. EQUIPMENT

29¢ Programs manufacturer's overrun of cassette software for TRS-80, Atari, PET, RTC. New original plastic cases 100 assorted $20 our-choice. **Compuware,** 15 Center Road, Randolph, NJ 07869. 6-78

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GANDALF LDS1000 rack. Retail $600. Must sell $99 shipped pp COD. **Kelly Hancock, 503-285-8876.**

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Keyboards. Microswitch. 74-key, Hall-effect, high quality. Parallel ASCII. Like New-$45. Used-$25. **Digital Search, 803-877-9444.**

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One Hand Keyboard (right) includes word processing and printer. Portable entry system. New $600. Best offer over $200. **Bill Gale, 201-763-8027.**

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Paper Shredder. Hunt/Boston model 1690. Like new. $99 shipped pp COD. **Kelly Hancock, 503-285-8876.**

Quadram 32K Microfazer spooler, serial-in - parallel out, $119, 603-783-4708.

Sage IV one meg. RAM 12M hard disk 640k floppy P-system and IDRIS operating systems spread sheet word processor ABSdoft Fortran and more; Televideo 925 included $2200 or best offer. **215-557-0438.**

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Uninterruptible power supply El6ar 30 minutes 12.3 Amps. New $5500, Sell $1500. **509-624-5235. Gary R.** 4-80

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Wanted: used chart recorders. Working or not. **Smith, 305-661-3834.** 6-78

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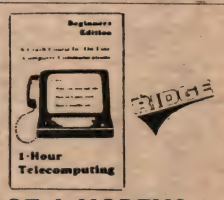
(189) BOOKS, MAGAZINES

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Turbodos Made Easy, 198 pg. Guide to this versatile Multi-user Operating system. Pub. 1984 @ $24.95. Special offer--$8.50 pp. Quantity pricing avail. **Len Dworkin,** 874 B'way, New York, NY 10003.

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(190) MISC. LARGE SYSTEMS

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CP/M 2.2 Learn all the secrets. Fully commented, nothing left to the imagination, supplied on 8" disk. All memory locations revealed. Contains CCP, BDOS. Also a "souped-up" Z80 version. 100s of satisfied customers. Send $50 to: **"Source",** PO Box 63, Greer, SC 29652-0063.

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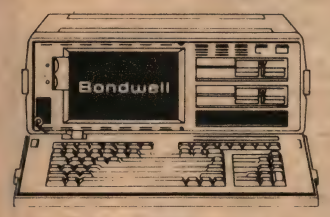
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$399

Reads Kaypro and Osborne Software

The Bondwell Model 12 CP/M computer - 64k RAM, Dual 180k SSDD Disk Drives, $399; Also available, Model 12A - 64K RAM, dual DSDD 360K Disk Drives, $449; Model 14 - 128K RAM, Dual DSDD 360K Disk Drives, $499. Complete WordStar, MailMerge, ReportStar, CalcStar, DataStar package included free! For more information on this and other super bargains, see ad index for full page **BCE** display ads in red. **BCE 1-800-545-7447.**

Pre-Owned, original disks - Microsoft MBasic 80 V5.2 interpreter, MBasic Compiler 80 V5.3, $150 each; digital Research CBasic 80 V2.8 $75; Wordstar 86 V3.3 $150; Supercalc 86 V1.12, $100; Crosstalk XVI V3.0 for Compupro $90; All 8" CPM disks with original documentation. **Walter Anderson,** 3168 Star Lake Dr., Birmingham, AL 35226. **205-933-2858.**

Wanted: Info on hardware/software conversion of Zilog MCZ1/25 Microcomputer to run CPM. 1405 Angelina, Denton, TX 76205. 5-77

(192) MISC. SOFTWARE

Compuquest Adventures. Apple, Atari, C64. Professional full-featured Text Adventures. $12.95-$17.95 (Disk Only). Send SASE for 1986 Catalog. **Compuquest,** Box 492, St. Croix Falls, WI 54024. 6-78

FMS-80 DBMS software for Victor 9000 (MS-DOS) $115. **Harry Beerman,** 2510 Wysstead Drive, Fort Wayne, IN 46819. 219-639-3035. 5-77

For Sale; Tektronix 8560 Development System Assembly Language software 68000168008 M68K series $200. **203-755-1180.** 6-79.

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Dealers - Use Mail Master, mailing list software for IBM PC compatibles, to promote your business and increase traffic by offering at only $5. Your cost - $2 each in lots of $0 plus $2.50 shipping. Circulars provided. Write to: **MicroDesigns,** 2954 Orlando Road, Oklahoma City, OK 73120.

HARD SECTORED DISKETTES: We have them! Delivery within 24 hrs. Lifetime Warrantee. 5.25 (ss/sd $12.50), (ds/dd $15). **Al Levy,** Box 71, Hicksville, NY 11802. **516-293-8368.** 1-81.



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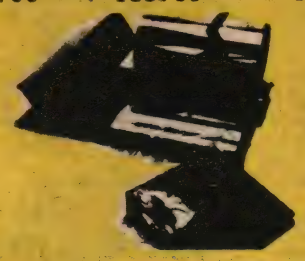
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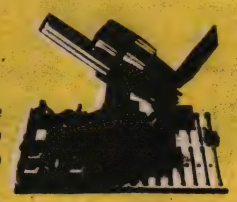


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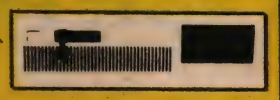
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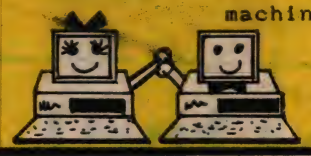


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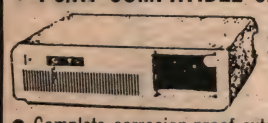
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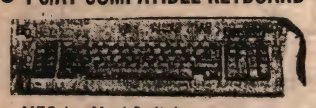
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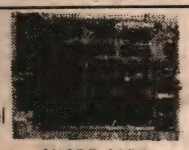
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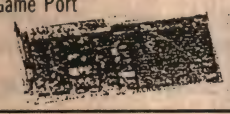


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- Game Port
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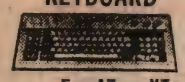


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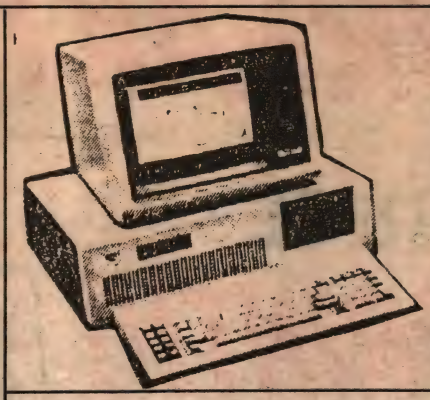
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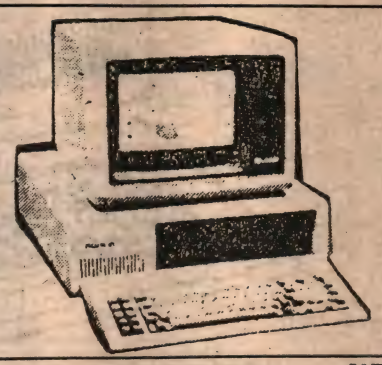
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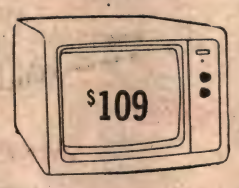
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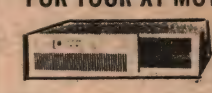
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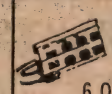
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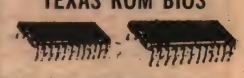
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TERMS: Check or Money Order. COD's Add $1.90. TX Res. add 6% Tax. Please add $3.50 shipping. All out of stock items will be refunded.

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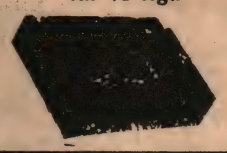
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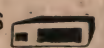


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PIO-255	Parallel printer card	$29
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MFC-100	Multi-funct. w/para., ser., clok/cal & 384K Exp. No mem. installed, software	$90
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CAB-500	6' keyboard ext. cable	$5
CAB-550	6' composite video cable	$2
CAB-600	Special 8 pin RGB to DB9 cable	$13
CAB-300	6' IBM power cable	$3
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16 Amp On/Off
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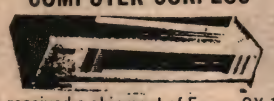
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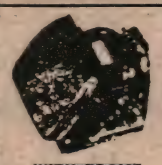
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WITH FRAME
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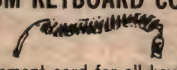
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SWITCH/FILTER FOR EAGLE, CORONA & COMPAQ
Stk. #FIL-100.....$9.95

IBM REPLACEMENT KEYBOARD CABLE

IBM KEYBOARD CORD

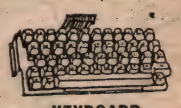


Replacement cord for all keyboards. 6' long, cream color. Stk. #KC-509 $4.95

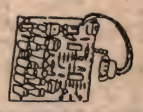
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SOUND & VIDEO MODULATOR
TI #UM1381-1 — can be used with all video sources. Built-in A-B switch. Channel 3 or 4 output. Requires 12VDC power..$3.50



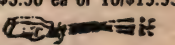
KEYBOARD
PN 900181 — 48 keys. Measures 4"x9". Terminates to a 15 pin connector $3.75



SWITCHING POWER SUPPLY
INPUT: 14 VAC to 25.5 VAC
OUTPUT: +12VDC @ 350MA
+5VDC @ 1.2AMP



WALL PLUG ADAPTER
TN-21 — used with the above power supply. Output 21VAC @ 45VA.
TN-21 .$3.50 ea or 10/$19.95



CASSETTE INTERFACE CABLE
CIC-93 — has DB-9 connector on one side to 3 RCA phono jacks on the other end.
.....$1.50 ea or 10/$10



TI GAME CABLE
CAB-15 — one end has a DB25 female going to 2 DB15 female connectors. Cable is 6' long $4

RADIO-SHACK COMPUTER SURPLUS



TRS-80 Mod III motherboards populated boards with all IC's except ROM & RAM. We have a ton of these to close out!
TR-3B damaged boards with hole or corner clipped .....3/$14
Mod III ROM set $20
Mod III RAM set $15

TANDY 2000 MOTHERBOARDS
Assembly line rejects. Circuit boards are undamaged. These boards are very repairable. No RAM, ROM or PROM installed.
Stk. #TRS-2000D $29.95

MODEL 3 KEYBOARD CAPS
A complete set of key caps to replace your lost or broken keys. 100 sets available.
Stk. #TRS-3KC $6.95/set

KEYBOARD SWITCHES
We have Radio Shack keyboard replacement switches to fit just about every model.
Stk. #TRS-SW.....2/$1.50

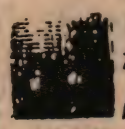
REPLACEMENT ANTENNAS
Replacement antenna for Tandy Radios. Fits many models.
Stk. #TRS-Ant .....3/$1.00

ATARI GAMES



ATARI GAME ROMS
An assortment of 10 Atari game ROMs. Simply open any Atari cartridge & replace the existing ROM with a new one. Play another 10 games instantly.
Stk. #ROM-10 .....10/$2.50

XEROX 820-1



XEROX 820-2 Z80 SINGLE BOARD COMPUTER
Assembled & Tested $89.95
- 64K RAM
- 80 x 24 Video
- Floppy disk controller
- 2 parallel ports
- Serial port

XEROX 1810 MOTHERBOARD
The 1810 is a portable CPM machine that never made it into mass production. These Z-80 Motherboards are becoming collectors items. These boards have on-board serial, parallel, video w/RF modulator, & 64K memory. Boards are solder line rejects and are missing some chips. ROM set included. Limited quantity so order early!
Xerox Xerox 1810 ....$39.95
CPM Boot Disk.....$6.00
Power Transformer for 1810 $12.50

AT CLONE BUILDERS MANUAL

Complete manual on assembly AT clone machines. Diagnostic & format routines.
Stk# AT-Book $24.95

$6.95 Stk. # WTN-1810



Extremely Hard To Find!!!

XEROX 1810 Power Transf.



COMPUTER SPEAKERS
2.25" 8 ohm, 25 watts. This is the same speaker that IBM uses. Excellent for computer builders.
Stk. #SPK-8 .....$.65

DIABLO SII PRINTER $145.00

- Serial Interface
- Bi-Directional Printing
- 100 CPS Speed
- Tractor Feed

IMPROVED VIDEO ROM FOR HERCULES COMPATIBLE CLONE BOARDS #VROM-125 $9.95

CPM DISKETTE FOR USE WITH NEC V-20 PROCESSORS $3.75

FORTIS DM-20 RIBBONS $3.75

FULL HIGH FLOPPY DRIVES

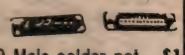


MPI 525 DSDD 40 track. "As Is" $29
COC Quad density $49.95

IBM PUBLIC SOFTWARE $3.75/Disk

PC-Write — Word Processor
PC-File — Database Manager
PC-Calc — Spreadsheet
PC-Desk — Desk-Top Manager
Toolbox 1 — DOS Utilities
Toolbox 2 — DOS Utilities
Toolbox 3 — DOS Utilities
Games 1 — Argade Games
Games 2 — Arcade Games
PC-Business — Business Accounting
PC-Modem — Modem Program
PC-Home — Home Management

Popular DB Series Computer Connectors



9 Male solder pot..$1
9 female solder pot $1
9 hoods .....$.65
25 male solder pot$.125
25 female solder pot $1.25
25 hoods .....$.75

4164-150 PULLS — $.59

3 VOLT LITHIUM BATTERY



Used as battery back-up on most multi-function cards.
Mallory BR-2325
$1.00 EACH — 10/$5.00
Holders for above ..10/$5.00

EAGLE 1600 MOTHERBOARD IBM COMPATIBLE $79.95



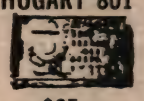
- 8086-2 Processor (8MHZ)
- 128K Mem. (512K Max)
- 8 I/O Slots
- With BIOS ROMs
- Complete Undamaged
- Surplus from Eagle

MFG. BY ELSTON COMMODORE SURPLUS



12" GREEN SCREEN MONITOR
Composite video input built in power supply. Requires 18VAC XFMR.
Useable on IBM's $19.95
Transformer for above ..$3.50

SHUGART 801



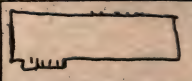
$65 8" DRIVE

KAYPRO SURPLUS



KAYPRO EQUIPMENT
81 Series ROMS (K2) ..$7
Keyboard Siemens w/case $65

KAYPRO MAINBOARDS
K2 socketed (no ICs) .. $27.50
K2 populated, tested $129
K10 tested $225
Pro-8 Upgrade kit...$39



IBM PROTO BOARD ORIGINAL IBM
Stk. #BD-306
$29.25

LOLIR LECTRONICS

13933 NO. CENTRAL #212
DALLAS, TX 75243
214-234-8032 — 214-234-8091 — 214-234-8105

TERMS: Check or Money Order. COD's Add $1.90. TX Res. add 6% Tax. Please add $3.50 shipping. All out of stock items will be refunded.

master charge VISA

ELECTRONIC SURPLUS COMPONENTS & GOOD STUFF

MACHINE PIN SOCKET



22 PIN GOLD PLATED SOCKET
5 Pcs. $1.00
Stk. #ICS-22M



$.75
ROCKER SWITCH
16 Amp On/Off
Used in Xerox 820 Computers



Full Wave Bridge
6AMP-300V
2/$1.00



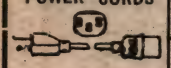
MINI-TOGGLE SWITCH
5AMP DPDT
$.65 EA
10/$4.50

SNAP ACTION SWITCH



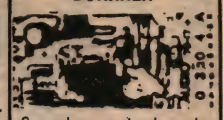
MICRO-SWITCH ASS'T OF 10
$2.50
Stk. #500-10M

COMPUTER POWER CORDS



$1.75 EA
— 10/$12.50

CIRCUIT BOARD BONANZA



Sound generator boards removed from electronic pin-ball games. Contains oscillators, control circuits & 2 watt audio amp. Experimenter's dream!!!
$2 ea — 10/$12.50
w/schematics

5V & 12V REGULATOR BOARD

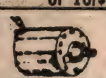
Regulator board containing 5V & 12V to-220 regulators, fuses, bridges, caps & I/O connectors. Size 2"x4" w/heatsinks.
REG-512 .....$3.50

RECTIFIER BOARD

Contains (4) 10 Amp bridges, (3) large filter caps, & I/O conn. Size 4.5" & 8".
BRDG-4 .....$2.50ea or 10/$12.50

LINEAR & CMOS BONANZA

Circuit board removed from SINGER electronic calculators. has 20 linear & cmos IC's & a wealth of other parts.
BD-20 .....$2.50 ea or 10/$12.50



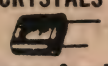
12 VDC TOY MOTOR
Stk. #MO-12 ..2/$1.00

GIANT CAPACITOR ASSORTMENT
500 PCS. $9.95



COLECO JOYSTICKS
$2.50 EACH
10/$17.00

CRYSTALS



Frequency	Case	Price
40 MHZ	HC18	$1.25
6 OMHZ	HC18	$1.25
8 OMHZ	HC18	$1.25
10 7MHZ	HC18	$.75
14 318MHZ	HC18	$1.25

IC BARGAINS

LS00 ...$.15	LS123 ..$.42	LS240 ...$.60
LS01 ...$.15	LS124 .$1.40	LS241 ...$.60
LS02 ...$.15	LS125 ..$.30	LS242 ...$.90
LS03 ...$.15	LS126 ..$.40	LS243 ...$.80
LS04 ...$.15	LS132 ..$.40	LS244 ...$.50
LS05 ...$.15	LS133 ..$.25	LS245 ...$.50
LS08 ...$.15	LS138 ..$.35	LS251 ...$.45
LS09 ...$.15	LS139 ..$.30	LS253 ...$.40
LS10 ...$.15	LS145 ..$.55	LS257 ...$.45
LS11 ...$.15	LS151 ..$.40	LS258 ...$.50
LS12 ...$.25	LS153 ..$.30	LS259 .$1.00
LS13 ...$.30	LS154 ..$.75	LS260 ...$.40
LS14 ...$.25	LS155 ..$.40	LS266 ...$.30
LS15 ...$.30	LS156 ..$.40	LS273 ...$.75
LS20 ...$.15	LS157 ..$.30	LS279 ...$.30
LS21 ...$.18	LS158 ..$.40	LS280 ...$.80
LS27 ...$.21	LS160 ..$.50	LS283 ...$.35
LS30 ...$.15	LS161 ..$.40	LS290 ...$.65
LS32 ...$.20	LS162 ..$.60	LS293 ...$.75
LS33 ...$.25	LS163 ..$.35	LS298 ...$.65
LS37 ...$.30	LS164 ..$.50	LS299 .$1.50
LS38 ...$.25	LS165 ..$.80	LS322 .$2.50
LS42 ...$.30	LS166 ..$.75	LS323 .$2.25
LS51 ...$.20	LS169 .$1.00	LS364 ...$.90
LS54 ...$.25	LS174 ..$.35	LS366 ...$.40
LS55 ...$.20	LS175 ..$.35	LS367 ...$.40
LS73 ...$.30	LS181 .$1.25	LS368 ...$.30
LS74 ...$.23	LS191 ..$.80	LS373 ...$.50
LS85 ...$.45	LS192 ..$.70	LS374 ...$.75
LS86 ...$.19	LS193 ..$.74	LS375 ...$.35
LS93 ...$.50	LS194 ..$.60	LS377 ...$.90
LS107 ..$.28	LS195 ..$.50	LS378 ...$.80
LS109 ..$.20	LS196 ..$.70	LS390 ...$.80
LS112 ..$.30	LS197 ..$.75	LS393 ...$.75
LS122 ..$.35	LS221 ..$.50	LS399 .$1.00
		LS670 .$1.24



NEW! MILTON BRADLEY XFMR.
Input: 120VAC
Output: 12VAC CT @ 1.7AMP
UL Approved
Stk. #TN4243-33 $4.95

VOLTAGE REGULATORS



7805 5V 1.5amp
7812 12v 1.5amp
7824 24v 1.5amp
7905 5v 1.5amp
7905 5v 1.5 amp
7912 12v 1.5 amp
$.43 EACH

8237	$4.95
8237-5	$5.49
8250	$6.95
8251	$1.69
8251-A	$1.89
8253	$1.89
8263-5	$1.95
8255	$1.69
8255-5	$1.89
8259	$1.95
8259-5	$2.29
8272	$4.95
8279	$2.49
8279-5	$2.95
8282	$3.95
8284	$2.95
8286	$3.95
8288	$4.95

6845 VIDEO CHIP $4.50

EPROM

2716	$2.00
2532	$2.75
2732	$2.25
2764	$2.75
27128	$4.50

LOW PROFILE SOCKETS (TIN)



# OF PINS	PRICE
8	$.08
14	$.10
16	$.12
18	$.15
20	$.18
22	$.18
24	$.20
28	$.25
40	$.30

HEAT-SHRINK TUBING
100'
5/8" = $15.00
3/8" = $10.00

COMPUTER RUBBER FEET
4/$2.00

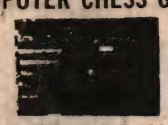
NEC 3500 40 CPS SERIAL PRINTER "REBUILT" PRINTER $550

COMPUTER GRADE CAPACITORS



Ass't of 10
Stk. #CCG-10 ...$2.50

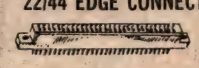
COMPUTER CHESS GAME



MILTON BRADLEY CHESS GAME
Electronic circuit board removed from famous toy maker's game. Board has 6502 processor. 74LS series IC's, buzzer & many other useful components. Boards are complete and un-damaged. MB part #7924243001.
BD-792 .....$3.95 ea. 10/$24

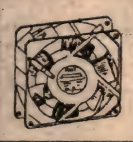
SPECIAL TRANSISTOR SALE STK. #T-500
500 PC 2N2222
Un-Marked — $3.50

EDGE CONNECTORS
ALL ARE 1.56" SPACING.
22/44 EDGE CONNECTOR



$2.00

31/62 Connector for IBM PC Board, .1" spacing $2.50



4" COOLING FAN
120 VAC
NEW
Stk. # FN-4 — $6.50

MAGNETS



2" Bar Magnet with Tape On One Side
2/$1.00



10" HI-FI BASS SPEAKER
2/$15.00
Stk. #SPK-2P



12 POS KEY PAD
Stk.# Kypd-12
$1.50

12 VOLT MINIATURE PC BOARD RELAY



SPOT
#REL-12Y
$1.25

SMALL COMPUTER QUALITY CAPS
CERAMIC MONOLYTHIC CAPS. FOR ALL TYPES OF COMPUTER APPLICATIONS.

PART #	MFD.	VOLTS	ULTRA STABLE COST
CMO-103	.01	50	.10
CMO-473	.047	50	.11
CMO-104	.1	50	.12

ELECTRONIC PIEZO BEEP BUZZER
Special — 2/$1.00
7/8" Diameter element on plasting mounting. Originally used in Radio Shack telephone as the ringer.
Stk. #PZO-78 ....$.75

ULTRAVIOLET TUBES GOOD FOR EPROM ERASERS
110 VAC
$2.25 ea. — 10/$15.00

POWER SUPPLY
General purpose compact power supply. 3 outputs: +5V @ 1 Amp. +12V @ 1 Amp. & +24V @ 1 Amp. Power Transistors mounted on a heat sink. 2"x4" w/transformer. Stk. #PS-3P $4.49

RIBBON CABLE



9 conductor Spectrastrip with red marker strip. 250' per roll. 28ga. stranded wire. WRIB-9 .....$10/roll
20 conductor spectrastrip with red marker stripe. 100' per roll. 28ga. stranded wire. WRIB-20 $.30/ft. or $25/roll
34 conductor spectrastrip with red market stripe. 100' per roll 28 ga. stranded wire. WRIB-34 $.45/ft. or $35/roll

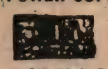
DISKETTE LOOSE LEAF HOLDER
Vinyl Diskette Holder
Holds 2-5¼" diskettes. Has 3 hole punch to mount in standard loose leaf folder. Stk. #1 VIN-5 .....10/$2.50
For standard 8½x11



8-PIN HEADER STRIP
Stk.#HDR-8
$.15 EACH

HOOK-UP WIRE ASS'T
6 SPOOLS OF
50' — $3.00
#WIR-30H

8" DRIVE POWER SUPPLIES



$24.50

8" Disk Drive Power Supply
Heavy duty supply can run up to 4 drives. Enclosed frame. Input 117VAC. Output: 5VDC @ 7 Amps: +24VDC @ 6 Amps: −24VDC @ 6 Amps.
Stk. #PS-8 ....$24.50

VITEK CABLE CONVERTER
Model No. TC-1M Converter. Both Mid-Band & VHF frequencies. Has built in power supply. Units are new & in working cond.
Stk. #TC-1M $9.95

1000 PIECE RESISTOR ASS'T
ALL SIZES & VALUES
Stk. #RES-1000 .$3.00



$695
OUTDOOR SPEAKER - HORN Stk. #Spkr-60

XEROX 1810 CPM BOOT DISK $3.75



$1.75
PLASTIC ENCLOSURE
2"x3"x4"

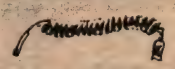
STANDARD 6' 3 PRONG LINE CORD
$.40 #CRD 6

DIABLO TYPE 30 POWER SUPPLIES
I15VE 8amps
$15.00

ALTOS 8000 COMP. $250

100 PC ASSORTMENT RF COILS
$3.50

COILED CORD BONANZA



4 conductor coiled cord. Black vinyl jacket. Extends to 6 ft. No connectors on either end.
Stk. #CC-000 ....3/$1.00
4 Conductor coiled cord. Black vinyl jacket. Extends to 6 ft. Phone connector on one end and no connector on the other.
Stk. #CC-020 ....2/$1.00
4 Conductor coiled cord. Grey vinyl jacket. Extends to 6 ft. Used as keyboard cable. Phone jack to 5 pin din connector.
Stk. #CC-100 .....$4.00

BUILD YOUR OWN EPROM ERASER
115VAC BLACK LIGHT (ULTRA VIOLET)



115 volt ultra violet light, with lamp, ballast and in-line cord switch. Just build enclosure to finish.
Stk. #EPB-125 .....$12.50

TI COMPUTER FLOPPY DRIVE CABLES



SINGLE FLOPPY DRIVE CABLE
Cable is 15" long with 34 pin card edge & 34 pin header conn.
CFS-15 .....$2.00 ea or 10/$14

DUAL FLOPPY CABLE
Cable is 34" long w/3 34 pin edge connectors.
CFS-30 .....$4.00 ea or 10/$25

POWER SUPPLY
MFG. BY GENERAL INSTR.



Input: 110VAC
Output: +5VDC @ 5Amps
+12VDC @ 2.5Amps
−12VDC @ 3Amps
PS-120 .....$24.50
Used in some Commodore comp.

WALL PLUG ADAPTERS



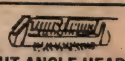
6VDC @ 300ma
$1.75 or 10/$12.50

ISOLATION TRANSFORMER



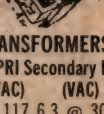
117VAC
117VAC @ 125VAC
Mfg. by Signal Trans
$3.00 each — 10/$20.00

RIGHT ANGLE HEADERS



40 pin	$.40
34 pin	$.50
10 pin	$.25

TRANSFORMERS



STK.#	PRI (VAC)	Secondary (VAC)	Price
TN-6.3	117	6.3 @ 300ma	$.125
TN-12	117	12 @ 400ma	$.135
TN-24A	117	24 @ 200ma	$.125
TN-24B	117	24ct. @ 3.6 Amp	$3.50

HEAT SINK TO-3
$.25



LOAR RESISTOR FOR IBM POWER SUP.



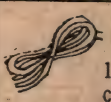
5 Ohm @
25 Watts
$1.79
Stk.#RIBM-5

12 VAC @ 250ma TRANSFORMER



TN12A
2/$1.50

WIRE
TEST PROBE WIRE



18 Guarage rubber coated. Red, black, white or blue .....100'/$13

HOOK-UP WIRE
24 Guage standard cond.
22 guage solid conductor, your choice 100"/$2
WIRE WRAP WIRE
30 Guage solid cond. Choice of colors. Wir-30 .....100'/$2.50

TOCOM 55 PLUS CABLE TV CONVERTER
55 CHANNEL CONVERTER



Complete Unit — $24.50
Mainboard — $7.50
Power supp. — $4.50
We Received A Large Shipment Of These Cable Converters. Good Savings!

10/$2.00
Stk.#HK-10
Heat sink ass't
All Types Incl.

ULTRA-SONIC TRANSDUCER
Don't know what these came out of but this is a doozey of a device. Unit is an aluminum cylinder containing a piezo-ceramic with an adjustable coil in parallel. Frequency is 24 khz. Can be used in many ultrasonic circuits.
Stk. #ULT-58 .....$2.25



TV-GAME SWITCH
$.65 EACH
OR 10/$4.25

ELECTRONIC COMPONENT BONANZA

STOCK#	DESCRIPTION	PRICE
Res20	Power res. ass't. 20pcs	$2.29
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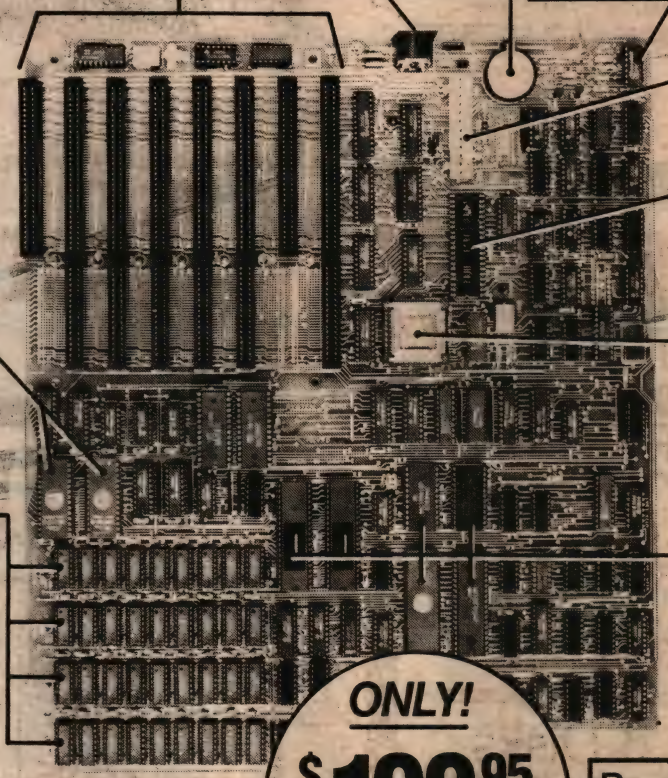
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2716	2048 x 8	(450ns)	4.95
2716-1	2048 x 8	(350ns) 25V	5.95
27C16	2048 x 8	CMOS	9.95
2732	4096 x 8	(450ns)	4.75
2732A-20	4096 x 8	(200ns) 21V	4.95
2732A-25	4096 x 8	(250ns) 21V	4.49
2732A-45	4096 x 8	(450ns) 21V	4.25
27C32	4096 x 8	CMOS	7.95
2758	1024 x 8	(450ns) Single +5V	5.95
2764-20	8192 x 8	(200ns) 21V	4.49
2764-25	8192 x 8	(250ns) 21V	4.25
2764A-25	8192 x 8	(250ns) 12.5V	4.49
2764-45	8192 x 8	(450ns) 21V	3.95
27C64	8192 x 8	CMOS 21V	5.95
27128-25	16,384 x 8	(250ns) 128K 21V	4.49
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27256-25	32,768 x 8	(250ns) 256K (12.5V)	7.95
27C256-25	32,768 x 8	(250ns) 256K (CMOS) (12.5V)	10.95
68764	8192 x 8	(450ns) 25V	15.95
68766	8192 x 8	(350ns) 25V	16.95
74S387	256 x 4	PROM O.C.	1.69
74S471	256 x 8	PROM T.S.	4.95
82S123	32 x 8	PROM T.S.	2.95
82S129	256 x 4	PROM T.S.	2.95

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Part No.	1-9	10-99	100-up
8 pin LP	.13	.12	.11
14 pin LP	.15	.13	.11
16 pin LP	.17	.15	.13
24 pin LP	.31	.30	.29
28 pin LP	.39	.37	.35
40 pin LP	.49	.46	.43

WIRE WRAP SOCKETS (GOLD) LEVEL #3

Part No.	1-9	10-99	100-up
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14 pin WW	.69	.65	.59
16 pin WW	.75	.69	.65
24 pin WW	1.19	1.09	.99
28 pin WW	1.39	1.29	1.19
40 pin WW	1.79	1.69	1.59

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DT1050 — Applications: Teaching aids, appliances, clocks, automotive, telecommunications, language translations, etc. The DT1050 is a standard DIGITALKER kit encoded with 137 separate and useful words, 2 tones, and 5 different silence durations. The words and tones have been assigned discrete addresses, making it possible to output single words or words concatenated into phrases or even sentences. The "voice" output of the DT1050 is a highly intelligible male voice. **The DT1050 consists of a Speech Processor Chip, MM54104 (40-pin) and two (2) Speech ROMs MM52164SSR1 and MM52164SSR2 (24-pin) along with a Master Word list and a recommended schematic diagram on the application sheet.**

Part No.	Description	Price
DT1050	Digitalker™	$24.95
MM54104	Processor Chip	$12.95

DT1057- Expands the **DT1050** vocabulary from 137 words to over 250 words. Includes two (2) ROMs and specs.

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FE0203D	12.95	7211IPL (TTL)	7.95
7106CPL	8.95	7211MIPL (Micro)	8.49
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7107EV/Kit	46.95	7224IPL	10.95
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74HC00	.35	74HC175	.89
74HC02	.39	74HC221	1.95
74HC04	.39	74HC240	1.39
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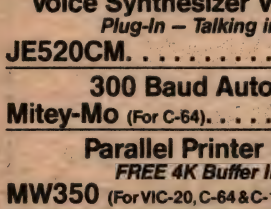
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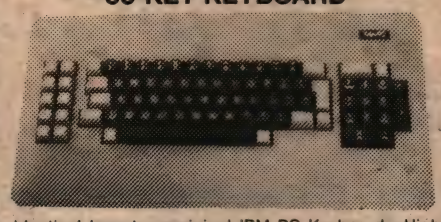
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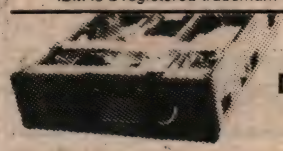
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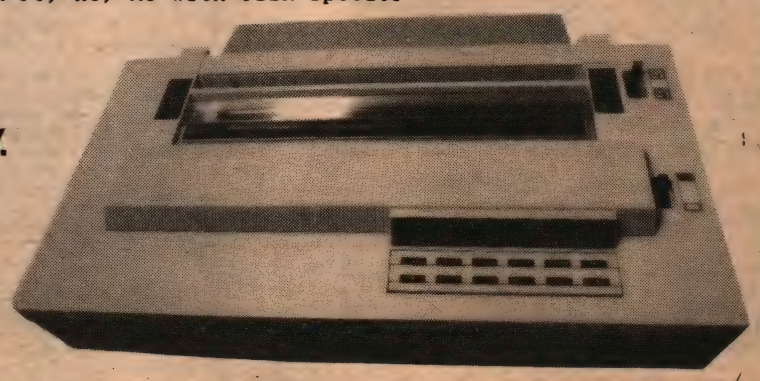
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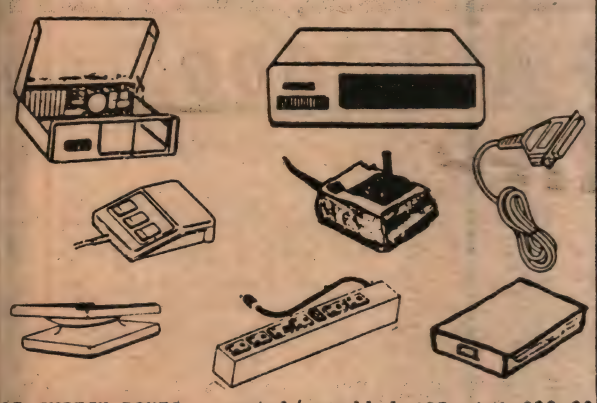
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* 5150 style keyboard
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* optional math co-processor*
* fully tested * fully compatible

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* amber or green, TTL or composite monitor
* slide-out or flip-up PC case
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* 8 card slots
* optional math co-processor*
* fully tested * fully compatible

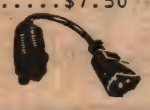
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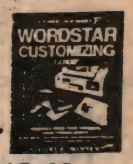
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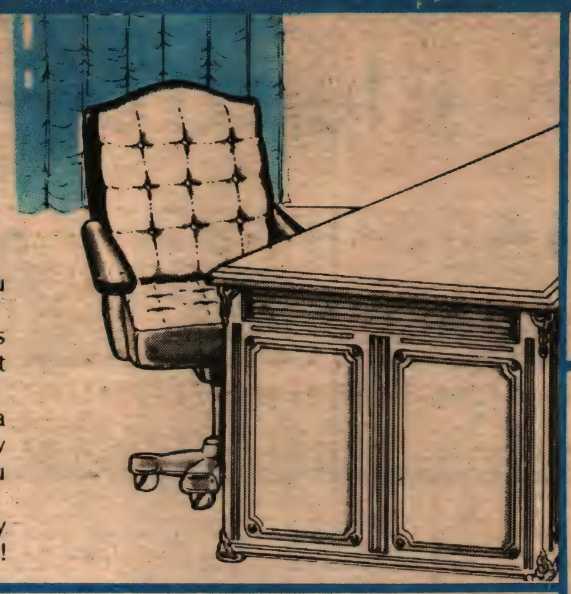
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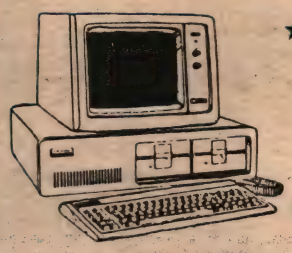
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• PROCESSOR	80286	80286	80286	80286
• 16-BIT PROCESSING (NO 8-BIT MASTER PARITY CHECK)	YES	NO	YES	NO
• NO CACHE SPEED REDUCTION RUNNING POPULAR PROGRAMS	YES	YES	YES	NO
COMPATIBILITY:				
• FULLY SOFTWARE/HARDWARE TRANSPARENT	YES	NO	NO	YES
• NO SOFTWARE PATCHES NEEDED	YES	NO	NO	NO
• RUNS LOTUS/INTEL BAT	YES	NO	NO	YES
• RUNS AT PROGRAMS	YES	NO	YES	YES
• NATIVE 80286 MODE	YES	YES	YES	NO
UPGRADEABILITY:				
• 80287 CO-PROCESSOR OPTION	YES	NO	YES	YES
• KARATE/DOCKING OPTION	YES	NO	NO	NO
• MULTIUSER OPTION	YES	NO	NO	NO
PERFORMANCE:				
• FULL 16-BIT BIOS	YES	NO	YES	NO
• FULL 16-BIT RAM	YES	NO	YES	NO
• MEMORY EXPANSION UP TO 16 MB	YES	NO	NO	NO
• INCLUDES 1 MB MEMORY	YES	NO	YES	NO
• INCLUDES PRINTER SPOOLER/RAMDISK	YES	YES	YES	NO
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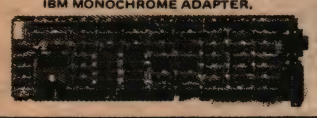
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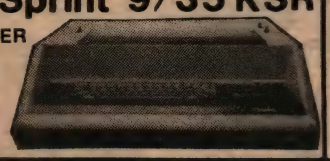


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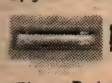
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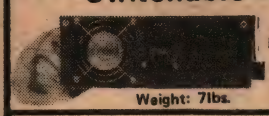
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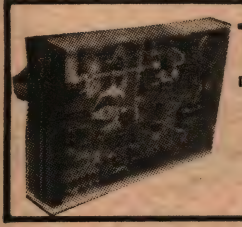


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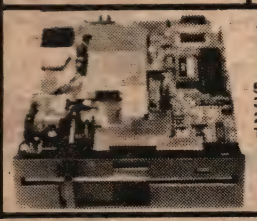
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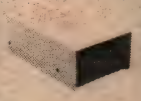


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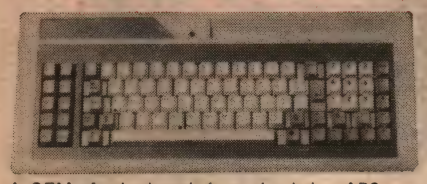
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APPLE IIE® DETACHED KEYBOARD

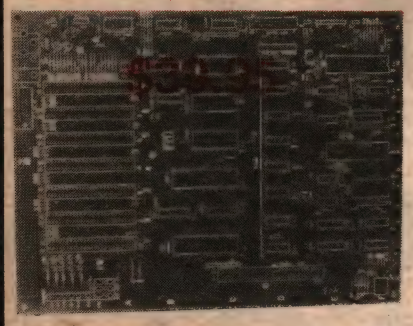


A GEM of a keyboard, in a nice beige ABS case. Lets you build an IBM look-a-like that runs like a IIE with 2 drives in case using our $69.95 case on this page. This KB is fully IIE compatible, with all functions..... $149.95

Disc Doubler



MOTHER BOARD



100% IIe compatible motherboard, for those who wish to build a clone of the ever popular APPLE IIe. It is a reverse engineered copy with no infringements on it. The gate array custom IC's are new designs that work-a-like but do not violate any copyrights. We do not sell the software but you can buy a IIe upgrade kit and install it on the board. You can not remove the gate array chips to install custom boards as they are not the same as Apple's ones, but this is not a problem with any plug in board as it is 100% hardware and software compatible.

Bare PCB and data $39.95
Custom IC set (3).....$49.95
Keyboard Encoder.....$14.95
Character Generator.....$14.95

IIe® ABS PLASTIC CASE



$49.95

please specify II+ or IIe case style

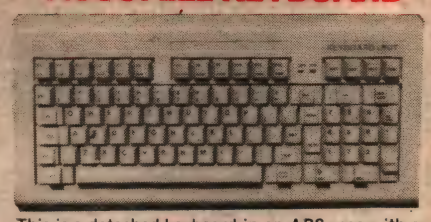
This case is a nice fit for our motherboard, keyboard and power supply.
It has no logo or infringing pattern on it.



The famous APPLE-SEED and APPLE-SEED II are the books that see all, tell all on the various APPLE clone motherboards and peripherals. They are well worth the $12.95 that we are asking. And KOSMIC has been at it again on IBM clone motherboards and peripherals and has composed the one and only "BIG BLUE SEED", it goes into greater detail on a smaller number of motherboards and peripherals (over 20 and growing) and will help you to build many of them at a saving.

APPLE-SEED I Motherboard book $12.95
APPLE-SEED II Peripheral card book (over 75 cards)..... $12.95
BIG BLUE SEED IBM peripherals and motherboards (over 50) $14.95

MAK II ACCUFEEL KEYBOARD



This is a detached keyboard in an ABS case with a 6" curly cord to connect ot to 6502 based machines. It used a serial data format for error free transmissions down the curly cord with a serial to parallel to converter board on the end that is fully 6502/ Apple compatible. Has auto repeat, beep, no beep. 10 user programmable macros, 50 preprogrammed macros, auto line number. $149.95

FRANKLIN COMPATIBLE

PARTS

100Ns delay line	$6.95	0.1 Mono caps, 0.2"	
7 Ns delay line	$9.95		$0.10
62 Pin edge conn	$2.00	0.1 Mono caps, 0.1"	
50 Pin edge conn	$1.50		$0.12
5 Pin DIN conn	$1.50	50 Pf trimcap	$0.75
8 Pos DIP switch	$1.00	2-3" speaker	$1.50
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4.7Kx6 SIP	$0.69	APPLE power set	$3.50
4.7Kx8 SIP	$0.99	6 pin row power set	$1.49
1Kx7 SIP	$0.59	square power set	$2.49
1KX8 SIP	$0.59	MPSA13	$0.49
2.2Kx9SIP	$0.79	2N4258	$0.75
10Kx9 SIP	$0.79	2N3904	$0.29
33 Ohm DIP	$1.49	2N3906	$0.29
4.7K DIP	$1.49	2N2222	$0.35
		2N2907	$0.39
		MPSU51	$1.00

HARD DRIVE CABINET

$59.95



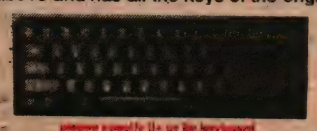
This is a very nice case for your hard drive, it has space for 2 1/2 height drives with cover-up bezel for one only. The back is cut for fuse holder, AC plug, switch, connector panel and 3 1/2" AC or DC fan.

We also have some switching power supplies for one or two drives. The 40 Watt unit has 5V-4A and 12V-1.5A and the 60 watt one is 5V-7A and 12V-2.5A.

40 W $39.95 **60 W $59.95**

IIe® MATRIX KEYBOARD

This keyboard runs the IIe clone motherboard listed above and has all the keys of the original. Fits case.



$69.95

please specify II+ or IIe keyboard

ASCII KEYBOARD

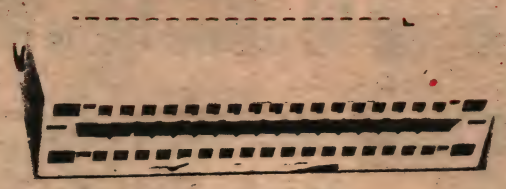


New Serial Parallel

$19.95

A great deal, this brand new ASCII keyboard came from AES DATA, one of the largest makers of word processors in the world. A novel circuit generates both serial and parallel ASCII out allowing use on both APPLE and IBM styles of system. The unit runs on +5V only, has Hall effect keyswitches and uses an 8048 micro for operation. The sculptured keytops are arranged in typewriter style for quick learning and are an attractive light beige color. We got them for 5% of the $169.00 that AES paid and so we can sell them dirt cheap and still make money. Completely new with 20 pin ribbon IDC connector and pinout for easy interfacing..... $19.95

RIBBON CABLE CONNECTORS (IDC)
INSULATION DISPLACEMENT CONNECTORS



DB STYLE (D-SUBMINIATURE)

PUT NUMBER OF PINS WHERE "XX" IS TO FORM PART NUMBER

			9	15	25	37
SOLDER CUP	MALE	DBxxM	75	85	1.10	1.60
	FEMALE	DBxxF	80	90	1.15	1.65
RIGHT ANGLE	MALE	DBxxMR	1.10	1.35	1.75	2.25
	FEMALE	DBxxFR	1.15	1.45	1.85	2.35
RIBBON CABLE	MALE	DBxxIDCM	1.95	2.25	2.50	3.95
	FEMALE	DBxxIDCF	2.25	2.49	2.49	4.50
HOODS	METAL	MHOOD	.99	.99	.99	1.25
	PLASTIC	PHOOD	.49	.49	.49	.59

PIN HEADERS

	10	20	26	34	40	50
SOLDER PIN MALE S	.45	.65	.85	1.25	1.50	2.25
SOLDER PIN MALE RA	.60	.75	.95	1.35	1.50	2.50
RIBBON FEMALE	.90	.90	1.25	1.45	1.80	1.99
RIBBON CARD EDGE	1.50	1.95	2.35	2.25	2.50	3.50

FLEA CLIPS 12 FOR $2 (SHORTING BLOCKS)

CENTRONICS 36 PIN

RIBBON MALE	2.95
RIBBON FEMALE	2.95
SOLDER MALE	1.95
SOLDER FEMALE	1.95

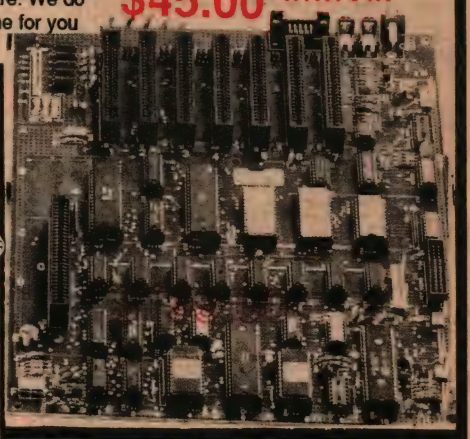
EASY TO GET SNAPPABLE HEADERS

40 PIN S	.95
40 PIN RA	1.35
80PIN(40x2)S	2.25
80PIN(40x2)RA	2.75

CLONE MOTHERBOARD WIRED 64K

Yes this is a copy of the ever popular IIe computer, it has no software on it and the custom gate array chips are brand new designs that do not infringe at all. The board is 100% software compatible and 100% hardware compatible. It will not operate with add-ons that require the removal of the gate array custom IC's as they differ in pinout. It will operate upgrade software that can be bought at any dealer, and the original software. We do not suggest you make and sell clones, just make one for you to use at home and no-one will bother you.

EXT 80 COL CARD $45.00 WITH 64K



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We ran out of the APPLE ADD-ON Bare PCB and had to go to our supplier to get e real deal from him so we could sell more boards. But we could not get a good enough price to keep the sale prices ae we were buying fresh stock, but we asked him for a real deal and we kept the price rise to a minimum.

IBM COMPATIBLE
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HEXPACK*** A workalike copy of the famous AST SIX-PACK , WITH UP TO 384K RAM, Clock, Calendar and Serial and Parallel ports. 100% IBM and AST compatible, complete with schematic, parts placement and assembly data.....$29.95
Optional complete manual and software diskette...$8.95

MONTE CARLO CARD*** One of the best multifunction cards we have ever seen. This one takes either 64K or 256K RAMS in any combination for up to 1 Mbyte on board. (640K DOS accessble, balance subroutine accessed) PLUS two game ports, Clock, Calendar and Serial and Parallel ports. Clearly an awe inspiring array of functionality on a single card. Complete with schematic, parts list and placement diagram.....$34.95
Optional complete manual and diskette.....$8.95

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MONOCHROME GRAPHICS*** A workalike copy of the very nice HERCULES mono card, with static RAM on board. With all assembly data.....$29.95

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DISC CONTROLLER*** A ½sized card for regular slot that is 100% compatible, runs 1-4 drives.....$14.95

DISC CONTROLLER +GAME I/O. A very compact ⅓ sized card that has two game ports and runs 1-4 drives. 100% compatible with all assembly data.....$19.95

MULTIFUNCTION CARD** The older style with only 256K RAM On board with Serial, Parallel ports, Clock, Calendar. A very good style card on sale while they last, this is a copy of the earlier AST 256K multifunction cards. Complete with all assembly data.....$19.95

384 RAM** RAM only in close array, 384K of 64K RAM ideal for economy enhancement of system capacity. With all assembly data.....$19.95

512K CARD*** Another very economical expansion card. Takes 64K RAM In close array. With all assembly data.....$24.95

KRAM CARD*** We took a 512K card and rewired it for 256K RAMS. It now has four times the memory or 2 MBYTES. It closely follows the function of the popular JRAM card as all this type do, and also shares partition ing parameters to the extent that it will run the JRAM software or other similar programs. RAM Disc Drives are very easy to delineate. With all assembly data.....$34.95

PROTOTYPE CARD. 100% WW holes with DB-25 and DB-9 footprint on end.....$24.95

MEMORY PROTOTYPE CARD. This unique card has a memory array at one end. 36 16 pin sockets are placed in copper on board with all bussing in common, but with CAS, RAS etc brought out row by row and column by column so that either 64K or 256K RAMS can be quickly wired in. A 0.1 bypass cap is on each IC as well. The remaining ¾ of the board is 100% WW holes with a DB-25 and DB-9 footprint on one end.....$24.95

EXTENDER CARD. When you need to service a card with power on it is very hard to get at the board to trace signals etc so we made this little gem that lifts the whole thing up by about 6" for easy access.....$19.95

A ¼ size card with two serial ports on board.....$14.95

PARALLEL PRINTER CARD. A ¼ size card with a complete IBM std centronics printer porton board, with all data.....$14.95

GAME CARD. A ¼ sized card with two game ports.....$14.95

DISC CONTROLLER + PRINTER CARD. Runs a parallel centronics printer and 1-4 drives. With all data....$24.95

PIA CARD. A fully locatable dual port PIA card. The two ports are DIP Switch programmable anywhere.....$19.95

PIA + PROTOTYPE CARD Same as above by a full sized card with WW holes and DB-25 and DB-9 footprint.....$24.95

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a real Steal at.....$39.95

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stuffed and wave soldered so you can save all that time soldering them up. All you need are the IC's memory, and BIOS and you're set to go.....$89.95



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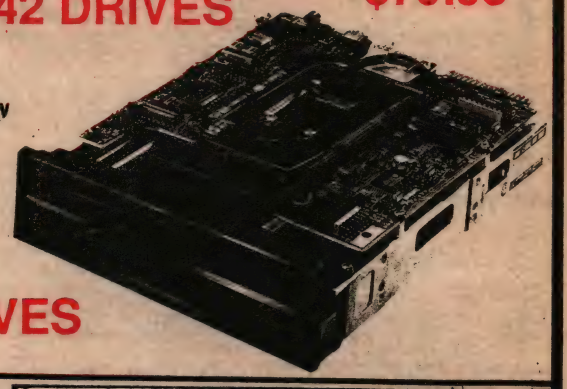
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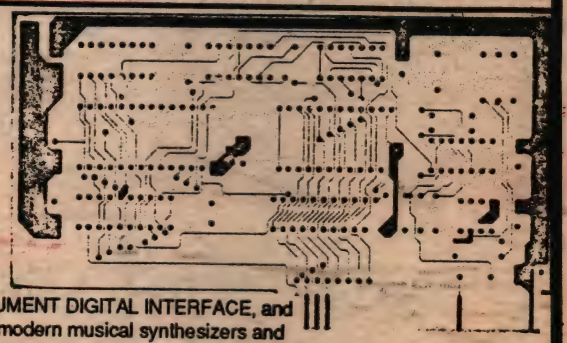
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MIDI is an acronym for MUSICAL INSTRUMENT DIGITAL INTERFACE, and is a powerful new standard interface for modern musical synthesizers and other new equipment. All the Japanese makers and most in the USA have conformed to the standard.

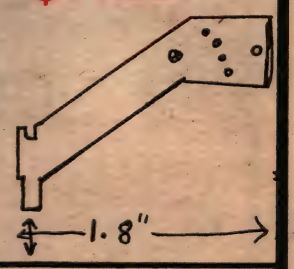
The MIDI sourcebook is a valuable source of data for the APPLE and IBM MIDI user. There are many starter programs and listings of places to buy and how to build, fix, make, etc for the MIDI-MAN. Pls specify APPLE or IBM when ordering.

$19.95

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Please specify back or side cutour for power supply.

2 FOR $99.00

We also have an IBM 8 Slot/6502 Board dual duty case for making IBM look-a-like 6502 systems.....$79.95

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640K PCB $25 with case

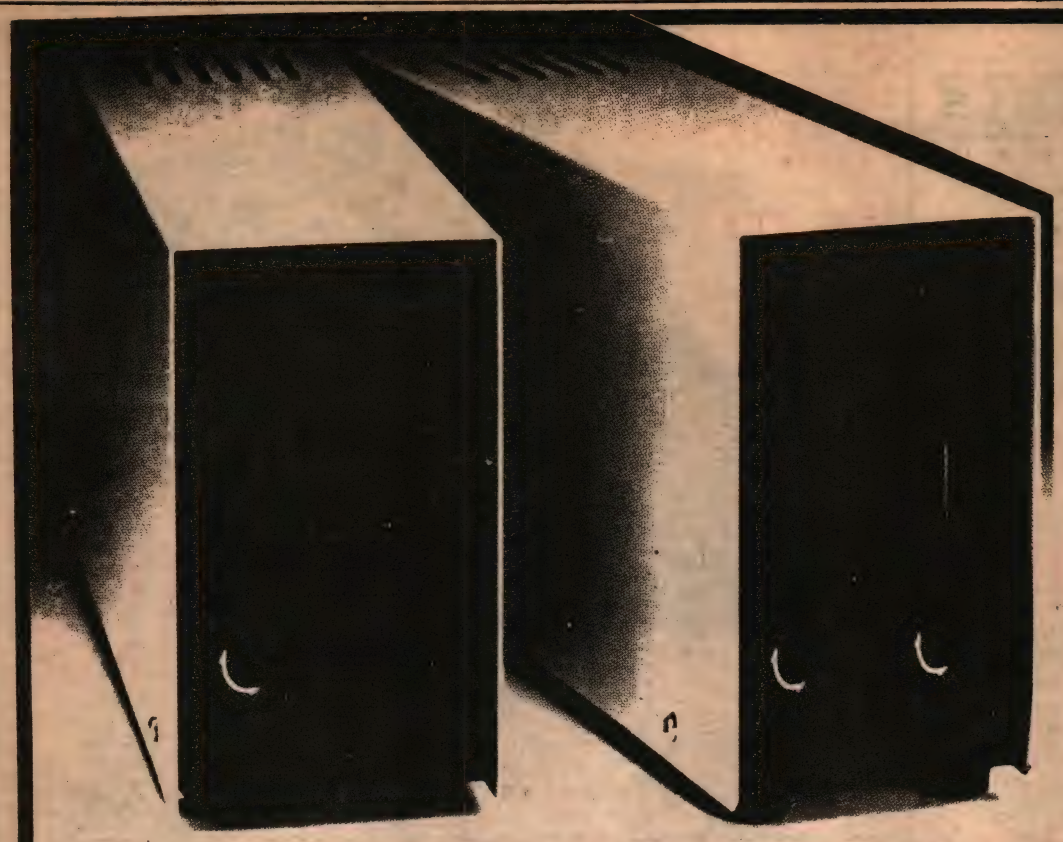
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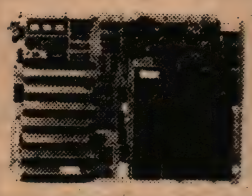


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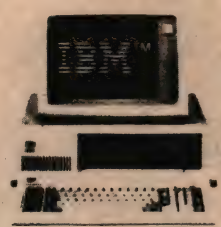
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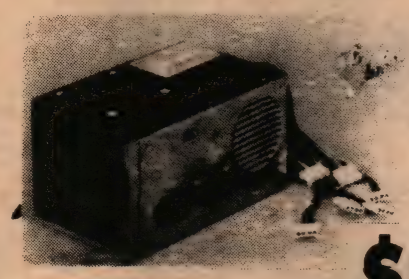
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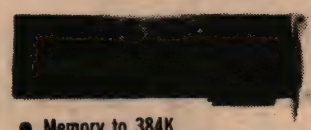
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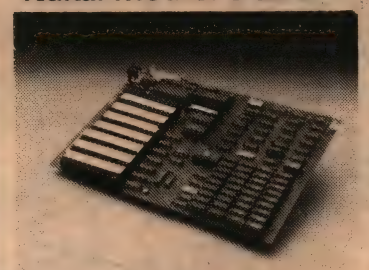
- A Nakai Computer Case, flip top, with same dimensions as that of the PC/XT.
- A PC/XT compatible Nakai Keyboard. Key switches by Misumi of Japan. Large return and shift keys. Capital and Number lock keys with LED.
- A Nakai Switching Power Supply. 135 Watts, side mount switch, 4 floppy power plugs.
- System packaging similar to IBM PC/XT.

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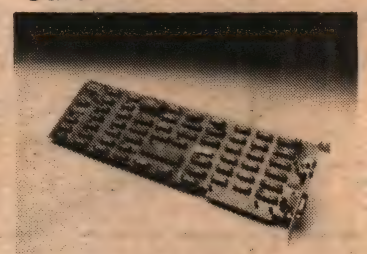
Nakai Mother Board



- 256 K Expandable to 640K on Board
- 4 Layer PC Board (Equal to IBM)
- (CPU) 4.77 or 8 MHz, 8088-2. 8087-2 Co-Processor Optional.
- 8 Expansion Slots

Price : $239

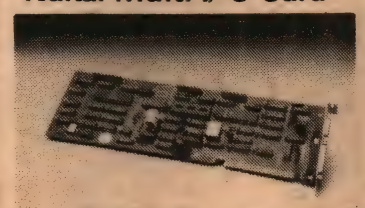
Nakai Color Graphic Card



- RGB Color, Composite, Monochrome Composite
- 4 Layer PC Board
- Text Mode: 40 Column x 25 Row, 80 Column x 25 Row
- Graphic Mode: 320 Dot x 200 Line (Color, Black & White) 640 Dot x 200 Line (Black & White)
- Attribute: Reverse Video Blanking & High Light

Price : $105

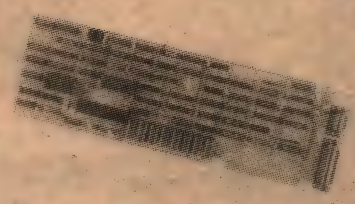
Nakai Multi I/O Card



- Controls 2 Floppy Disk Drives
- 4 Layer PC Board
- 1 Parallel Port
- 2 Serial Ports (1 Optional)
- Real Time Clock/Calendar
- Game I/O Port

Price : $135

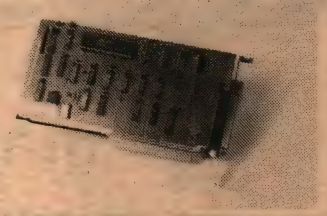
Nakai Monochrome Graphic Card



- With Parallel Printer Port
- Resolution: 720 x 348
- 4 Layer PC Board

Price: $109

Nakai Disk Controller Card



- Controls 4 Disk Drives
- (2 internal and 2 external) 4 Layer PC Board

Price : $ 49

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Nakai Trans-Net Card is a Comprehensive, High Performance, Low-Cost, and Easy-to-Use Local Area Network (LAN) for IBM PC/XT and Compatibles.

Nakai Trans-Net Local Area Network Transfers Data at 1 Million Bits Per Second Over A Twisted Pair Wire Cable Up to 4,000 Feet in Length, and as Many as 255 PCs can be Interconnected within A Network.

Price : $399

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- IBM Compatibles. With Software and Manual

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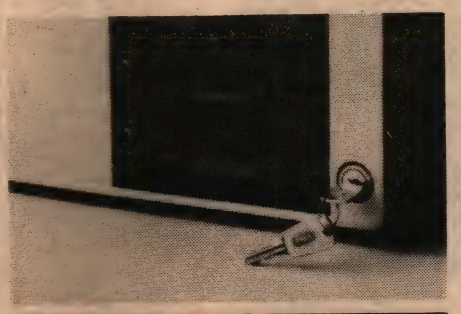
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SYSTEM I $999
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- Multi I/O Card
  2 Serial Ports
  Parallel Port
  Game Port
  Real Time Clock
  Calendar
  Controls 2 Floppy Disk Drives
- Monochrome Graphic Card or Color Graphic Card

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- 2 Floppy Disk Drives
- Multi I/O Card
- Monochrome Graphic Card
- High Resolution Monochrome Monitor

SYSTEM III $1,399
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- 2 Floppy Disk Drives
- Multi I/O Card
- Color Graphic Card
- Multi Display Monitor Color, Amber, Monochrome

SYSTEM IV $2,099
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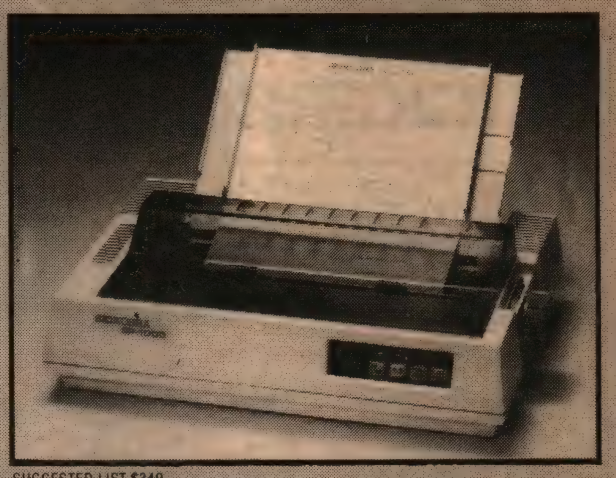
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SP-1000 PRINTER



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PRINTOUT SAMPLE

```
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
/0123456789:;<=>?@ABCDEFGHI
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
EFGHIJKL
789:;<=>?@ABCD EFGHIJKLMNOPQ
```

In order to keep your loyalty we at MidWest Micro are always looking for more printer and less price. In that search we've found for you a real gem in the price/performance arena. The Seikosha SP-1000 is made with the same precision and durability you have come to expect from the quality leader in the watch industry – Seiko.

The SP-1000 is completely full featured with the latest advances incorporated. It provides excellent near letter quality printing with a dense 24 by 18 dot density. This equates to 41,472 addressable dots per inch and gives superb "typewriter like" printing. Other printers with resolution this high cost hundreds of dollars more.

With the SP-1000 your computer can print 40, 48, 68, 80 or 136 characters per line. It can print 35 separate character styles including 13 double width and 3 reversed styles. You get Pica, Elite, Condensed and Italics – plus true superscripts and subscripts. All this can be done automatically, through easy commands right from your keyboard.

You get all these great features plus much, much more with the SP-1000 and there is a model made to fit your application. (This saves further in interfacing costs and problems). So call today to order or ask for a free brochure and print sample.

SP-1000 Series

	Your Price
• **SP-1000A,** Centronics parallel	$219
• **SP-1000AS,** RS-232C serial version	229
• **SP-1000 I,** IBM® PC compatible	229
• **SP-1000VC,** Commodore® C-64/C-128™ compatible	199
• **SP-1000AP,** Apple® IIC/Macintosh™ compatible	239

Features

- Impact dot matrix method, bi-directional in logic seeking, undirectional in graphic printing.
- 100 (Draft mode), 20 cps (Near Letter Qaulity) print speed, with reduced noise level.
- Pin-feed or friction-feed available.
- Automatic paper loading function.
- Paper empty detection.
- Input data dump in hexadecimal.
- Right, left margin set function.
- Self test printing.
- A variety of functions including Underline, Bold print, Double striking.
- A variety of print character sets including, Pica, Elite, Proportional, Elongated, Condensed, Italics, Super/Subscripts, and Italic Super/Subscripts.
- Automatic printing.
- Optional intelligent serial interface (#SP-80010)
- Downloadable Characters.
- Standard 1.5K buffer.

Character Font			Character Structure (H x V + Space)	Maximum Column Number	Character Spacing (Characters/Inch)	Print Speed (Characters/Second)
Standard Character	Standard	Pica	*12x9	80	10	100
		Elite	*12x9	96	12	50
		Condensed	*14x9	137	17	70
	Near Letter Quality	Pica	*24x18	80	10	20
		Elite	*12x18	96	12	24
Italic Cursive Character	Standard	Pica	*16x9	80	10	100
		Elite	*16x9	96	12	50
		Condensed	*18x9	137	17	70
	Near Letter Quality	Pica	*32x18	80	10	20
		Elite	*32x18	96	12	24
Graphic	Single Density Graphic		nx8	480 dot column	—	600 dot column
	Double Density Graphic		nx8	960 dot column	—	490 dot column
	Double Speed, Double Density Graphic		nx8	*960 dot column	—	600 dot column
	Quadruple Density Graphic		nx8	*1920 dot column	—	*980 dot column
	640 Dot Graphic		nx8	640 dot column	—	326 dot column
	576 Dot Graphic		nx8	576 dot column	—	294 dot column
	720 Dot Graphic		nx8	720 dot column	—	367 dot column

*Indicates that the specified figure includes half dots.

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- Full Tandy 1000 compatibility
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- DMA Controller on board
- Low power consumption
- Optional Clock/Calendar with 20-year battery

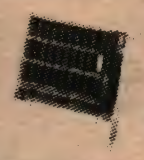
With 256K only LIST $109
Add Clock/Calendar LIST $39

With 512K RAM
LIST PRICE $149

576 RAM HALF CARD

$79

Without memory LIST PRICE $119



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- Brings System up to 640K
- Uses 64K and/or 256K DRAM
- Low power consumption
- Optional Clock/Calendar Add $40 with 20-year battery

384K Half Card	$159
512K Half Card	189
576K Half Card	209
Add Clock/Calendar	239

MONOCHROME GRAPHICS CARD



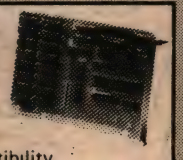
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Monochrome Text-only
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- Full IBM PC, XT, AT compatibility
- 640x200 mono; 320x200 color pixels
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I'm absolutely delighted to be able to offer you this durable and versatile printer for only $179. And you can expect the same friendly, courteous service both before and after the sale plus full warranty care from MidWest Micro.

Our supply is limited and they can't last long at this unbelievable price. So call today and get the buy of the year!

Sincerely
Mark L. Runkle
President
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Gemini 10X



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If you are looking for a top quality printer at an affordable price, you've found both in the Gemini 10X. The Gemini 10X operates bi-directionally at 120 cps. It switches from standard 80 column printing to 132 column condensed and 96 standard ASCII characters. This gives you the capabilities to do everything from recipes to spreadsheets. The character matrix offered includes the descenders, emphasized, double strike, block graphics and hi and low bit image graphics. These features give the Gemini 10X versatility enough for use in your home or office. The Gemini 10X also features a buffer expandable to 8K that lets you continue to work – not waste your time waiting on your printer. Breakdowns? Virtually unheard of with the Gemini 10X – with a print head life of over 100 million crisp, clean characters. The Gemini 10X comes complete with both friction and adjustable tractor feed. It even includes a free roll paper feed mechanism for greater economy.

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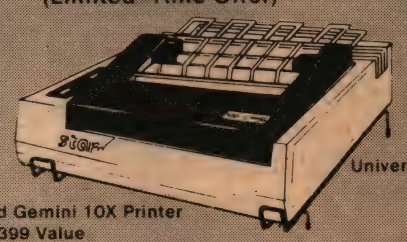
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These printers are new in factory containers and come to you complete with manufacturers warranty.

Again this is a limited offer and will not be repeated. So call now and "Save with Confidence" to the tune of several hundreds of dollars.

We at MidWest Micro will continue to do our best for you. Thank you for your generous patronage.

Sincerely,

Mark L. Runkle
President

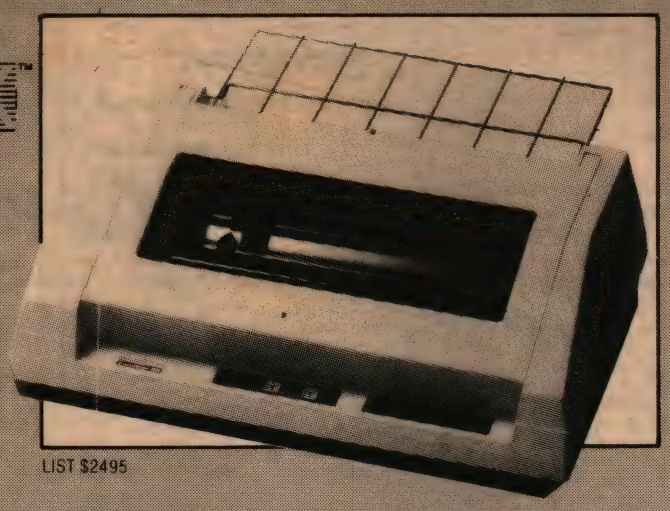
420 CPS COMREX CR-420 Business Printer MOVES MOUNTAINS

COMREX™

CR-420

JUST

$895



LIST $2495

This stupendous brute of a printer will make short work of even your largest spreadsheets and reports. You will surprise yourself and amaze your friends and colleagues with this super printer performing in your office. Don't miss out on this one!

SPECIFICATIONS

Carriage Width: 132 Columns (at 10 pitch)

Print Method: Impact dot matrix, bidirectional, logic seeking in both text and graphics

Print Speed: 420 CPS/Draft; 104 CPS/Correspondence Quality; 2500 dots/sec – standard graphics; 1250 dots/sec – high-density graphics

Print Head: 8-pin, staggered arrangement

Character Sets: Standard 96 ASCII printing in 17 fonts

Line Spacing: n/180 (n=0-255)

Paper Feed: Pin feed (paper width adjustable) and built-in friction feed

Paper Width: 5" to 15" (pin feed); Up to 16" (feed)

Paper Path: Rear and bottom entry

Paper Thickness: Original plus 4 copies (5-part)

Ribbon: Cassette style, single color (black)

Interfaces: Parallel – Centronics-style; Serial –RS232C Asynchronous

Baud Rate: 1200, 2400, 4800, 9600; switch selectable

Protocols: X-ON/X-OFF, READY/BUSY, ETX/ACK, switch selectable

Buffer: 18K

Reliability: MTBF – 800 hours continuous printing; MCBF – 200 million characters; MTTR – 30 minutes

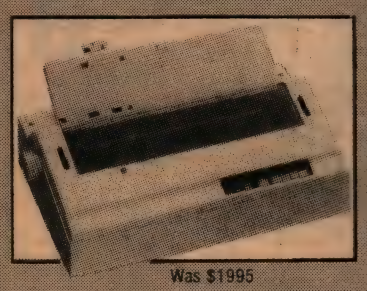
Power: 117 VAC ± 10%, or; 220 VAC ± 10%, 50/60 H_Z

Power Consumption: 55W (Standby); 175W (Operating at self test print); 250W (Operating at heaviest duty)

Environmental Limits: Temperature (operating) 5°-40°C, 40°-105° F; Humidity (operating) 20-80%

Dimensions: 595mm (W) x 194mm (H) x 405mm (D); 23.4" (W) x 7.6" (H) x 15.9" (D)

Weight: 27kg; 60 lbs.



Was $1995

COMREX™

CR-4

Your Price Just

$399

This bidirectional, logic seeking marvel lets you adjust the hammer intensity to print anything from single-page letters to five-part forms with equal clarity. A variety of impressive typestyles give you added print-versatility.

It is exceptional in many other ways. The 15½" wide carriage briskly prints all your ledgers, spreadsheets, and extra wide business graphics with ease. With the optional cut sheet feeder and tractor feeder, you can print several copies on your letterhead and switch to pin-fed paper for high volume word or data processing.

The 7K buffer holds a substantial amount of data while its printing.

The average life of the print wheel is 10 million characters. Which means that you can run it eight hours a day — every day of the week — for almost two full years. Of course, under more normal usage, it will handle your business correspondence and graphics for up to five full years without service. That's impressive.

Quiet quality.

What your eyes don't tell you, your ears will. Because this printer is much quieter than many more expensive printers. So you can keep the noise down while you keep the cost down.

Specifications

Print Speed	36 CPS (Shannon text)
Print Wheel	96 petals/wheel, cassette type, ASCII stand.
Print Wheel Life	10 million char./wheel
Characters/Line	132 characters (1/10"), 158 characters (1/12"), 198 characters (1/15")
Paper Width	16.5 in max (419 mm)
Copy Capacity	Original (45 kg) + 4 copies (15 kg) (total thickness 0.35 mm max.)
Carriage Motion	Bidirectional, logic seeking
Carriage Rtrn Speed	750 ms (at 13.2" return)
Line Spacing	6, 4, 3 lines/inch, 1/48" proportional increments
Paper Feed	Bidirectional, logic seeking
Paper Feed Speed	4"/second

Available Ribbons	Ribbon Life
Single-strike black carbon film	60,000
Multi-strike black carbon film	150,000
Single-strike black correctable film	70,000
Multi-strike black fabric	500,000
Single-strike red film	2,000
Correction tape	1,500

Interfaces	Centronics – Parallel RS-232C – Serial
Buffer Size	7K
Control Panel	Indicators: Select, Power, Alarm, Line, Pitch, and Copy (LEDs) Switches: Select, Line Feed, TOF, Line, Pitch, and Copy
Noise	Operating – Less than 65 dB
Temperature	50 to 105 F – 10 to 40 C (operating)
Humidity	20% to 80% non-condensing (operating) 5% to 90% non-condensing (storage)
Power	120 V, 60 Hz (Optional: 120 or 220 - 240 V, 50/60 Hz) 130 W Max.
Dimensions	21.18 (W) x 7.65 (H) x 15.15 (D) inches (538(W) x 194.5 (H) x 385 (D) mm)
Weight	33 lbs (15 kg)
Optional Features	Tractor feeder, Auto Cut Sheet Feeder, Single and Multi-strike ribbons, Interchangeable printwheels (Numerous languages and typestyles)

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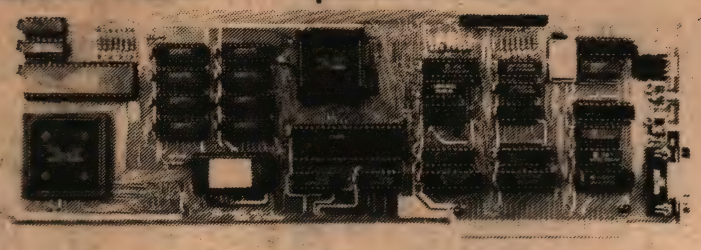
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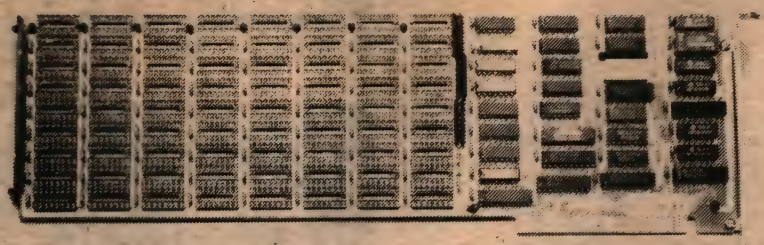
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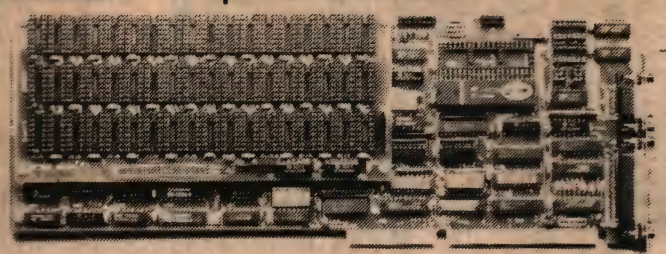
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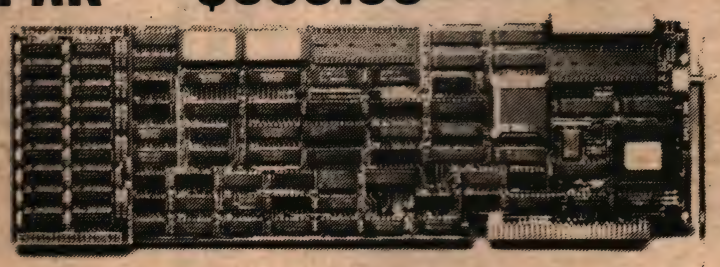


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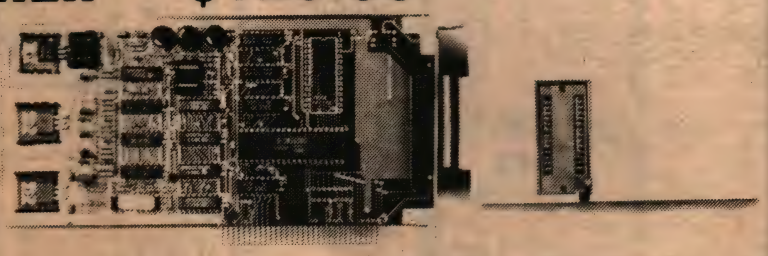
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74LS05	.18	74LS175	.39
74LS08	.18	74LS191	.49
74LS09	.18	74LS192	.69
74LS10	.16	74LS193	.69
74LS11	.22	74LS194	.69
74LS12	.22	74LS195	.69
74LS13	.26	74LS196	.59
74LS14	.39	74LS197	.59
74LS15	.26	74LS221	.59
74LS20	.17	74LS240	.69
74LS21	.22	74LS241	.69
74LS22	.22	74LS242	.69
74LS27	.23	74LS243	.69
74LS28	.26	74LS244	.69
74LS30	.17	74LS245	.79
74LS32	.18	74LS251	.49
74LS33	.28	74LS253	.49
74LS37	.26	74LS256	1.79
74LS38	.26	74LS257	.39
74LS42	.39	74LS258	.49
74LS47	.59	74LS259	1.29
74LS48	.69	74LS260	.49
74LS51	.17	74LS266	.39
74LS73	.29	74LS273	.79
74LS74	.24	74LS279	.39
74LS75	.29	74LS280	1.98
74LS76	.29	74LS283	.59
74LS83	.49	74LS290	.89
74LS85	.49	74LS293	.89
74LS86	.22	74LS299	1.49
74LS90	.39	74LS322	3.95
74LS92	.49	74LS323	2.49
74LS93	.39	74LS364	1.95
74LS95	.49	74LS365	.39
74LS107	.34	74LS367	.39
74LS109	.36	74LS368	.39
74LS112	.29	74LS373	.79
74LS122	.45	74LS374	.79
74LS123	.49	74LS375	.95
74LS124	2.75	74LS377	.79
74LS125	.39	74LS378	1.18
74LS126	.39	74LS390	1.19
74LS132	.39	74LS393	.79
74LS133	.49	74LS541	1.49
74LS136	.39	74LS624	1.95
74LS138	.39	74LS640	.99
74LS139	.39	74LS645	.99
74LS145	.99	74LS669	1.29
74LS147	.99	74LS670	.89
74LS148	.99	74LS682	3.20
74LS151	.39	74LS683	3.20
74LS153	.39	74LS684	3.20
74LS154	1.49	74LS688	2.40
74LS155	.59	74LS783	22.95
74LS156	.49	81LS95	1.49
74LS157	.36	81LS96	1.49
74LS158	.29	81LS97	1.49
74LS160	.29	81LS98	1.49
74LS161	.39	25LS2521	2.80
74LS162	.49	25LS2569	2.80
74LS163	.39	26LS31	1.95
74LS164	.49	26LS32	1.95

HIGH SPEED CMOS

A new family of high speed CMOS logic featuring the speed of low power Schottky (8ns typical gate propagation delay), combined with the advantages of CMOS: very low power consumption, superior noise immunity, and improved output drive.

74HC00

74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

74HC00	.59	74HC148	1.19
74HC02	.59	74HC151	.89
74HC04	.59	74HC154	2.49
74HC08	.59	74HC157	.89
74HC10	.59	74HC158	.95
74HC14	.79	74HC163	1.15
74HC20	.59	74HC175	.99
74HC27	.59	74HC240	1.89
74HC30	.59	74HC244	1.89
74HC32	.69	74HC245	1.89
74HC51	.59	74HC257	.85
74HC74	.75	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC368	.99
74HC107	.79	74HC373	2.29
74HC109	.79	74HC374	2.29
74HC112	.79	74HC390	1.39
74HC125	1.19	74HC393	1.39
74HC132	1.19	74HC4017	1.99
74HC133	.69	74HC4020	1.39
74HC138	.99	74HC4049	.89
74HC139	.99	74HC4050	.89

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT166	3.05
74HCT02	.69	74HCT174	1.09
74HCT04	.69	74HCT193	1.39
74HCT08	.69	74HCT194	1.19
74HCT10	.69	74HCT240	2.19
74HCT11	.69	74HCT241	2.19
74HCT27	.69	74HCT244	2.19
74HCT30	.69	74HCT245	2.19
74HCT32	.79	74HCT257	.99
74HCT74	.85	74HCT259	1.59
74HCT75	.95	74HCT273	2.09
74HCT138	1.15	74HCT367	1.09
74HCT139	1.15	74HCT373	2.49
74HCT154	2.99	74HCT374	2.49
74HCT157	.99	74HCT393	1.59
74HCT158	.99	74HCT4017	2.19
74HCT161	1.29	74HCT4040	1.59
74HCT164	1.39	74HCT4060	1.49

74F00

74F00	.69	74F74	.79	74F251	1.69
74F02	.69	74F86	.99	74F253	1.69
74F04	.79	74F138	1.69	74F257	1.69
74F08	.69	74F139	1.69	74F280	1.79
74F10	.69	74F157	1.69	74F283	3.95
74F32	.69	74F240	3.29	74F373	4.29
74F64	.89	74F244	3.29	74F374	4.29

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CMOS

4001	.19	14419	4.95
4011	.19	14433	14.95
4012	.25	4503	.49
4013	.35	4511	.69
4015	.29	4516	.79
4016	.29	4518	.85
4017	.49	4522	.79
4018	.69	4526	.79
4020	.59	4527	1.95
4021	.69	4528	.79
4024	.49	4529	2.95
4025	.25	4532	1.95
4027	.39	4538	.95
4028	.65	4541	1.29
4035	.69	4553	5.79
4040	.69	4585	.75
4041	.75	4702	12.95
4042	.59	74C00	.29
4043	.85	74C14	.59
4044	.69	74C74	.59
4045	1.98	74C83	1.95
4046	.69	74C85	1.49
4047	.69	74C95	.99
4049	.29	74C150	5.75
4050	.29	74C151	2.25
4051	.69	74C161	.99
4052	.69	74C163	.99
4053	.69	74C164	1.39
4056	2.19	74C192	1.49
4060	.69	74C193	1.49
4066	.29	74C221	1.75
4069	.19	74C240	1.89
4076	.59	74C244	1.89
4077	.29	74C374	1.99
4081	.22	74C905	10.95
4085	.79	74C911	8.95
4086	.89	74C917	8.95
4093	.49	74C922	4.49
4094	2.49	74C923	4.95
14411	9.95	74C926	7.95
4412	6.95	80C97	.95

7400/9000

7400	.19	74147	2.49
7402	.19	74148	1.20
7404	.19	74150	1.35
7406	.29	74151	.55
7407	.29	74153	.55
7408	.24	74154	1.49
7410	.19	74155	.75
7411	.25	74157	.55
7414	.49	74159	1.65
7416	.25	74161	.69
7417	.25	74163	.69
7420	.19	74164	.85
7423	.29	74165	.85
7430	.19	74166	1.00
7432	.29	74175	.89
7438	.29	74177	.75
7442	.49	74178	1.15
7445	.69	74181	2.25
7447	.89	74182	.75
7470	.35	74184	2.00
7473	.34	74191	1.15
7474	.33	74192	.79
7475	.45	74194	.85
7476	.35	74196	.79
7483	.50	74197	.75
7485	.59	74199	1.35
7486	.35	74221	1.35
7489	2.15	74246	1.35
7490	.39	74247	1.25
7492	.50	74248	1.85
7493	.35	74249	1.95
7495	.55	74251	.75
7497	2.75	74265	1.35
74100	2.29	74273	1.95
74121	.29	74278	3.11
74123	.49	74367	.65
74125	.45	74368	.65
74141	.65	9368	3.95
74143	5.95	9602	1.50
74144	2.95	9637	2.95
74145	.60	96S02	1.95

74S00

74S00	.29	74S163	1.29
74S02	.29	74S168	3.95
74S03	.29	74S174	.79
74S04	.29	74S175	.79
74S05	.29	74S188	1.95
74S08	.35	74S189	1.95
74S10	.29	74S195	1.49
74S15	.35	74S196	1.49
74S30	.29	74S197	1.49
74S32	.35	74S226	3.99
74S37	.69	74S240	1.49
74S38	.69	74S241	1.49
74S74	.49	74S244	1.49
74S85	.95	74S257	.79
74S86	.35	74S253	.79
74S112	.50	74S258	.95
74S124	2.75	74S280	1.95
74S138	.79	74S287	1.69
74S140	.55	74S288	1.69
74S151	.79	74S299	2.95
74S153	.79	74S373	1.69
74S157	.79	74S374	1.69
74S158	.95	74S471	4.95
74S161	1.29	74S571	2.95

VOLTAGE REGULATORS

TO-220 CASE

7805T	.49	7905T	.59
7808T	.49	7908T	.59
7812T	.49	7912T	.59
7815T	.49	7915T	.59

TO-3 CASE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49

TO-93 CASE

78L05	.49	79L05	.69
78L12	.49	79L12	1.49

OTHER VOLTAGE REGS

LM323K 5V 3A TO-3	4.79
LM328K Adj 5A TO-3	3.95
78H05K 5V 5A TO-3	7.95
78H12K 12V 5A TO-3	8.95
78P05K 5V 10A TO-3	14.95

LINEAR

TL066	.99	LM733	.98
TL071	.69	LM741	.29
TL072	1.09	LM747	.69
TL074	1.95	LM748	.59
TL081	.59	MC1330	1.69
TL082	.99	MC1350	1.19
TL084	1.49	MC1372	6.95
LM301	.34	LM1414	1.59
LM309K	1.25	LM1458	.49
LM311	.59	LM1488	.49
LM311H	.89	LM1489	.49
LM317K	3.49	LM1496	.85
LM317T	.95	LM1812	8.25
LM318	1.49	LM1889	1.95
LM319	1.25	ULN2003	.79
LM320	see7900	XR2206	3.75
LM322	1.65	XR2211	2.95
LM323K	4.79	XR2240	1.95
LM324	.49	MPQ2907	1.95
LM331	3.95	LM2917	1.95
LM334	1.19	CA3046	.89
LM335	1.40	CA3081	.99
LM336	1.75	CA3082	.99
LM337K	3.95	CA3086	.80
LM338K	3.95	CA3089	1.95
LM339	.59	CA3130E	.99
LM340	see7800	CA3146	1.29
LM350T	4.60	CA3160	1.19
LF353	.59	MC3470	1.95
LF356	.99	MC3480	8.95
LF357	.99	MC3487	2.95
LM358	.59	LM3900	.49
LM380	.89	LM3909	.98
LM383	1.95	LM3911	2.25
LM386	.89	LM3914	2.39
LM393	.45	MC4024	3.49
LM394H	4.60	MC4044	3.99
TL494	4.20	RC4136	1.25
TL497	3.25	RC4558	.69
NE555	.29	LM13600	1.49
NE556	.49	75107	1.49
NE558	1.29	75110	1.95
NE564	1.95	75150	1.95
LM565	.95	75154	1.95
LM566	1.49	75188	1.25
LM567	.79	75189	1.25
NE570	2.95	75451	.39
NE590	2.50	75452	.39
NE592	.98	75453	.39
LM710	.75	75477	1.29
LM723	.49	75492	.79

H=TO-5 CAN, K=TO-3, T=TO-220

IC SOCKETS

	1-99	100+
8 PIN ST	.11	.10
14 PIN ST	.11	.09
16 PIN ST	.12	.10
18 PIN ST	.15	.13
20 PIN ST	.18	.15
22 PIN ST	.15	.12
24 PIN ST	.20	.15
28 PIN ST	.22	.16
40 PIN ST	.30	.22
64 PIN ST	1.95	1.49
ST=SOLDERTAIL		
8 PIN WW	.59	.69
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80
WW=WIREWRAP		
16 PIN ZIF	4.95	CALL
24 PIN ZIF	5.95	CALL
28 PIN ZIF	6.95	CALL
40 PIN ZIF	9.95	CALL
ZIF=TEXTOOL		
(ZERO INSERTION FORCE)		

DATA ACQ INTERFACE

ADC0800	15.55	8T26	1.29
ADC0804	3.49	8T28	1.29
ADC0809	4.49	8T95	.89
ADC0816	14.95	8T96	.89
ADC0817	9.95	8T97	.59
ADC0831	8.95	8T98	.89
DAC0800	4.49	DM8131	2.95
DAC0806	1.95	DP8304	2.29
DAC0808	2.95	DS8833	2.25
DAC1020	8.25	DS8835	1.99
DAC1022	5.95	DS8836	.99
MC1408L8	2.95	DS8837	1.65

EDGECARD CONNECTORS

100	PIN ST	S-100	.125	3.95
100	PIN WW	S-100	.125	4.95
62	PIN ST	IBM PC	.100	1.95
50	PIN ST	APPLE	.100	2.95
44	PIN ST	STD	.156	1.95
44	PIN WW	STD	.156	4.95

36 PIN CENTRONICS

MALE		
IDCEN36	RIBBON CABLE	6.95
CEN36	SOLDER CUP	4.95
FEMALE		
IDCEN36/F	RIBBON CABLE	7.95
CEN36PC	RT ANGLE PC MOUNT	4.95

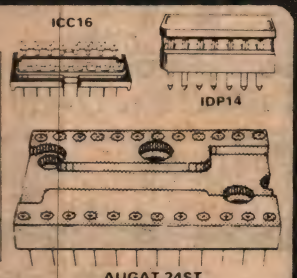
INTERSIL

ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	4.95
ICM7207A	5.95
ICM7208	15.95

DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS 8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.62	.79	.89	1.09	1.29	1.39	1.49	1.69	2.49
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE BELOW



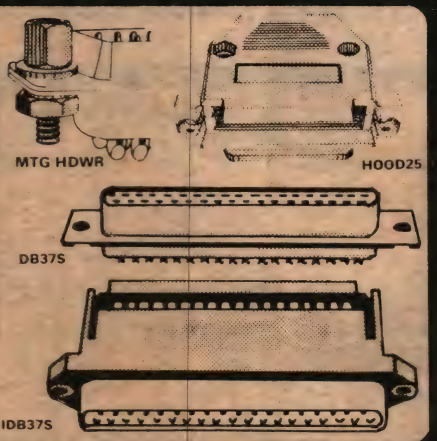
D-SUBMINIATURE

DESCRIPTION		ORDER BY	CONTACTS 9	15	19	25	37	50
SOLDER CUP	MALE	DBxxP	.82	.90	1.25	1.25	1.80	3.48
	FEMALE	DBxxS	.95	1.15	1.50	1.50	2.35	4.32
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.20	1.49	---	1.95	2.65	---
	FEMALE	DBxxSR	1.25	1.55	---	2.00	2.79	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	---	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	---	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.70	2.95	---	3.98	5.70	---
	FEMALE	IDBxxS	2.92	3.20	---	4.33	6.76	---
HOODS	METAL	MHOODxx	1.25	1.25	1.30	1.30	---	---
	GREY	HOODxx	.65	.65	---	.65	.75	.95

ORDERING INSTRUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED.

EXAMPLE: A 15 PIN RIGHT ANGLE MALE PC SOLDER WOULD BE DB15PR.

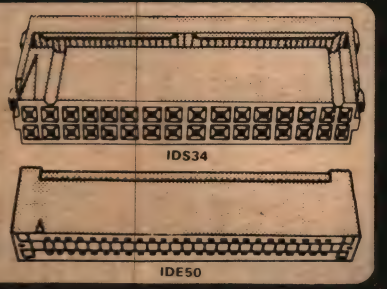
MOUNTING HARDWARE $1.00



IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS 10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE ABOVE



DIODES/OPTO/TRANSISTORS

1N751	.25	4N26	.69
1N759	.25	4N27	.69
1N4148	25/1.00	4N28	.69
1N4004	10/1.00	4N33	.89
1N5402	.25	4N37	1.19
KBP04	.55	MCT-2	.59
KBU8A	.95	MCT-6	1.29
MDA990-2	.35	TIL-111	.99
N2222	.25	2N3906	.10
PN2222	.10	2N4401	.25
2N2905	.50	2N4402	.25
2N2907	.25	2N4403	.25
2N3055	.79	2N6045	1.75
2N3904	.10	TIP31	.49

LED DISPLAYS

FND-357(359)	COM CATHODE	.362"	1.25
FND-500(503)	COM CATHODE	.5"	1.49
FND-507(510)	COM ANODE	.5"	1.49
MAN-72	COM ANODE	.3"	.99
MAN-74	COM CATHODE	.3"	.99
MAN-8940	COM CATHODE	.8"	1.99
TIL-313	COM CATHODE	.3"	.45
HP5082-7760	COM CATHODE	.43"	1.29
TIL-311	4x7 HEX W/LOGIC	.270"	9.95
HP5082-7340	4x7 HEX W/LOGIC	.290"	7.95

DIFFUSED LEDS

		1-99	100-UP
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.14	.12
JUMBO YELLOW	T1¾	.14	.12
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09

SWITCHES

SPST	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
SPST	TOGGLE ON-OFF	.49
BCD OUTPUT 10 POSITION 6 PIN DIP		1.95

DIP SWITCHES

4 POSITION	.85	7 POSITION	.95
5 POSITION	.90	8 POSITION	.95
6 POSITION	.90	10 POSITION	1.29

RIBBON CABLE

CONTACTS	SINGLE COLOR 1'	10'	COLOR CODED 1'	10'
10	.18	1.60	.30	2.75
16	.28	2.50	.48	4.40
20	.36	3.20	.60	5.50
25	.45	4.00	.75	6.85
26	.46	4.10	.78	7.15
34	.61	5.40	1.07	9.35
40	.72	6.40	1.20	11.00
50	.89	7.50	1.50	13.25

HARD TO FIND "SNAPABLE" HEADERS

CAN BE SNAPPED APART TO MAKE ANY SIZE HEADER, ALL WITH .1" CENTERS

1x40	STRAIGHT LEAD	.99
1x40	RIGHT ANGLE	1.49
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

SHORTING BLOCKS

GOLD CONTACTS SPACED AT .1" CENTERS



5/$1.00

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Yours truly, George Townsend

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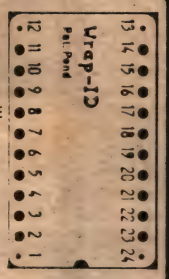
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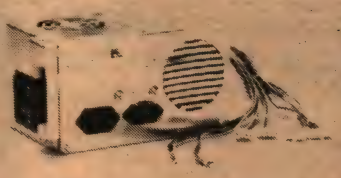
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PS-130



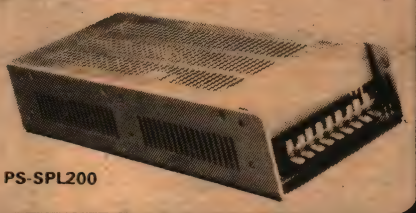
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- 130 WATTS
- SWITCH ON REAR
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PS-A $49.95
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6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

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10pf	50V	.05	680	50V	.05
22	50V	.05	.001µf	50V	.05
27	50V	.05	.0022	50V	.05
33	50V	.05	.005	50V	.05
47	50V	.05	.01	50V	.07
68	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10
560	50V	.05	.1	50V	.12

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	10	50V	.16
4.7	50V	.15	22	16V	.14
10	50V	.15	47	50V	.20
47	35V	.18	100	35V	.25
100	16V	.18	220	25V	.30
220	35V	.20	470	50V	.50
470	25V	.30	1000	16V	.60
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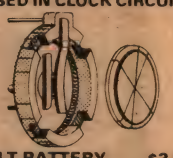
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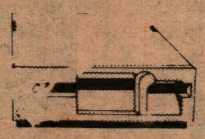
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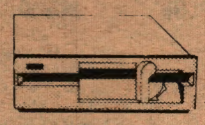
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FOR APPLE COMPUTERS

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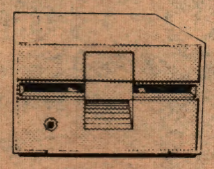
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- SIX MONTH WARRANTY

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- TEAC MECHANISM-DIRECT DRIVE
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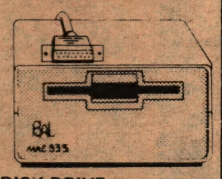
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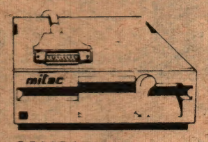
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- 100% MACINTOSH COMPATABLE
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- HIGH RELIABILITY DRIVE HAS AUTO-EJECT MECHANISM
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- FAST, RELIABLE SLIMLINE DIRECT DRIVE
- SIX MONTH WARRANTY

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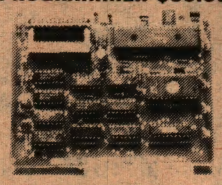
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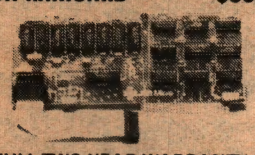
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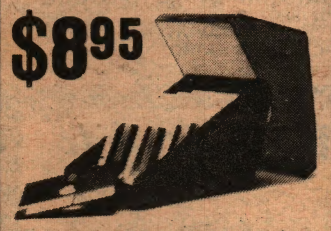
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FOR ATARI 400, 800, 2600, VIC 20/64 AND APPLE IIe

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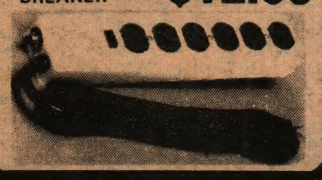


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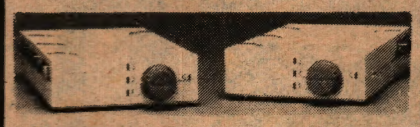
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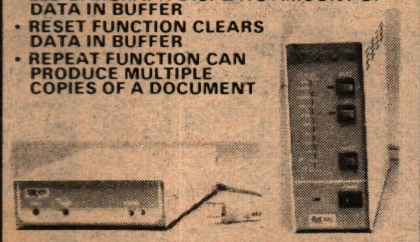
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SP120 SP110

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N-FD1	SS DD SOFT	$27.95
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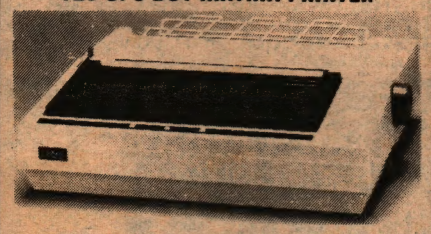
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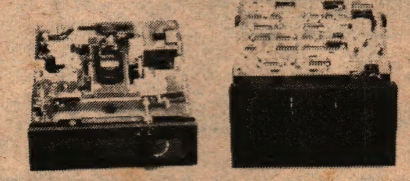
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TEAC FD-55 TANDON TM100-2

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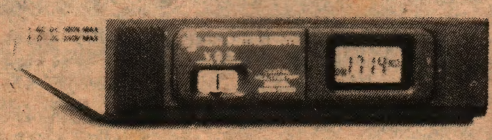
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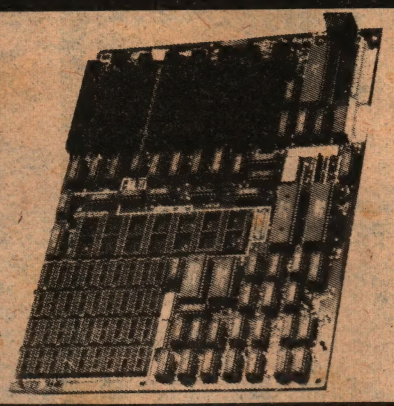
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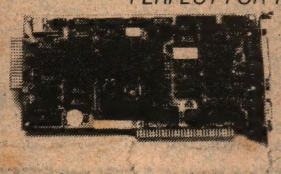
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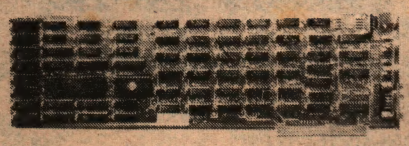


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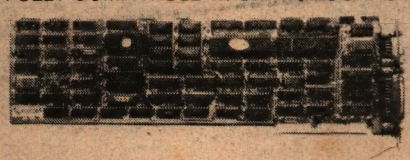
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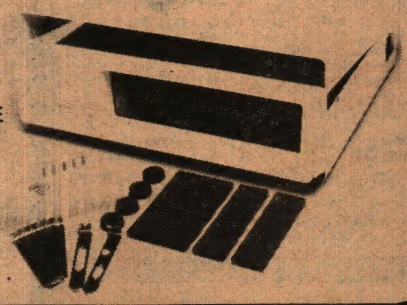
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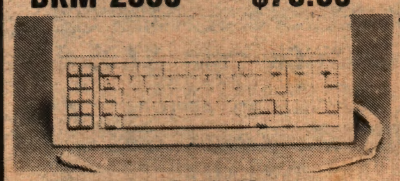
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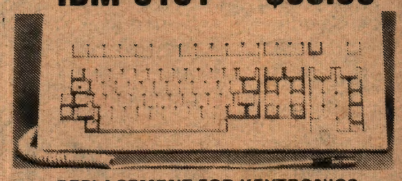
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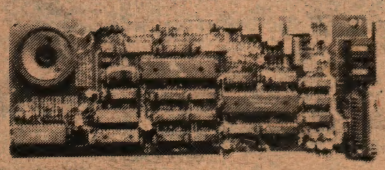
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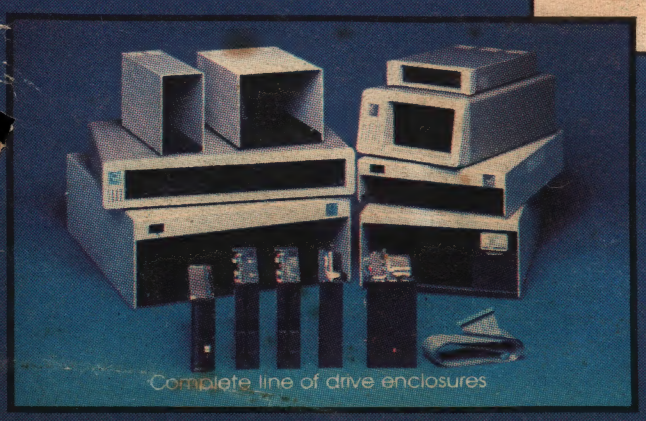
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